THE IRON TRADE REVIEW

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Corporation Activity Increases

Actual Output Last Week Slightly in Excess of 80 Per Cent and Present Week Will Make a Better Showing—Heavy Demand for War Materials

STEADY expansion characterizes the operations of the United States Steel Corporation, which last week reached 80 per cent of ingot capacity. The actual output was, in fact, slightly in excess of that percentage and the present week will make an even better showing. Two great subsidiaries of the Steel Corporation, the American Steel & Wire Co. and the Carnegie Steel Co., are operating at about 90 per cent of capacity. While the export business of the Corporation is large, the domestic demand is increasing at an encouraging rate.

Ferro Manganese

English ferro-manganese is now quoted at $100, seaboard, and sales of small quantities have been made at that figure. It is clear that the English makers are conserving their supplies and there is increasing anxiety as to the ability of steelmakers in this country to meet their requirements. Uncertainty concerning the opening of the Dardanelles, which would make possible the shipment of Russian manganese ore, adds to the seriousness of the situation. Owing to the scarcity and the high price of ferro-manganese, the unusual demand for manganates has become a factor of the Lake Superior iron ore market.

Plates and Shapes

The American Car & Foundry Co. is understood to have placed 20,000 tons of plates with a Pittsburgh maker, to be used in the manufacture of cars for the Pennsylvania system. Some additional orders for ships have been placed with eastern yards and three small coastwise vessels will be built by the Great Lakes Engineering Works, Detroit. Italy is inquiring for 6,500 tons of plates for four vessels. The contract for from 8,000 to 10,000 tons of shapes to be used in building Pennsylvania railroad cars at Berwick, Pa., has been placed with an eastern Pennsylvania mill by the American Car & Foundry Co. In some cases, companies building additions in order to be better able to take care of war contracts are urging such prompt completion of work that the business is not attractive to shops.

Machinery

An interesting feature of the machinery market is the immense demand for machine tools from Italy. One large dealer declined an order for fully 300 lathes for shipment to that country and other dealers and manufacturers are not disposed to take on additional orders. Hence the inquiries from Italy have resulted in very little business being placed. The buying of machinery for making munitions in this country continues very active. The American Clay Machinery Co., Willoughby, O., is in the market for hydraulic presses and it is understood that it will go into the manufacture of projectiles.

Bars

Some additional details in regard to contracts for bars for the making of shells have become public, but little is known definitely concerning some very large tonnages which are either pending or have been placed. The Carnegie Steel Co. will roll 1,800 tons, and the Lackawanna Steel Co. 8,600 tons for the American Locomotive Co.'s shell contract, and the Carnegie company will furnish from 12,000 to 15,000 tons on the New York Air Brake Co.'s shell contract.

Railroad Buying

The placing of the Pennsylvania railroad rail order has been delayed, owing to the very severe specifications resulting in mills asking an additional extra of $3.90 per ton, making the cost $32.15, mill, for bessemer, and $34.70 for open hearth. Owing to this high cost, the Pennsylvania may return to its old specifications. Additional rail orders announced amount to about 60,000 tons. The Southern Pacific has placed 26,000 with the Tennessee company, the New York Central has ordered 15,500 tons for the Lake Shore, the Chicago & Alton has ordered 8,000 tons, the Chesapeake & Ohio 4,000, and other orders, amounting to about 5,000 tons, have been taken.

THE OPEN HEARTH

The Iron Country Today—Rascality and Honesty on the Cuyuna

STOCK jobbing schemes and rank misrepresentations have seriously interfered with the development of the Cuyuna range. During the past few months, *The Iron Trade Review* has punctured some of the ridiculous claims made by promoters, especially those who were telling wonderful tales of marvelous deposits of manganese ore.

No one was more pleased by the publication of the "Truth About the Cuyuna" in *The Iron Trade Review* of Nov. 6, 1914, than the men who are honestly endeavoring to develop this new range and believe it has a great future. Said one of these men to the writer a few days ago: "*The Iron Trade Review* is absolutely right so far as it has gone in exploding false claims about the Cuyuna, but it has not gone far enough, for the stock jobbing schemes which have been attempted, and to some extent carried out, are so bad as to be almost beyond belief. Claims concerning the extent of the ore, its analysis and other features have deliberately and maliciously misrepresented the facts. Solicitors have gone from house to house in many towns of the northwest, soliciting subscriptions to companies having properties of little or no value. Many people have been misled and have invested their hard-earned money in these stocks."

Another operator on the Cuyuna asserted that he and other owners of mining property on that range have done all in their power to suppress the fakirs, but had met with little success.

In contrast with the fakirs are men of high character who are working along legitimate lines, and, while some of them may be very enthusiastic, there is reason for believing that their claims are well founded. Their estimates for production in 1914 were not fulfilled, as only 859,404 tons were shipped, although it was estimated that the shipments would amount to 1,500,000 tons. But men of the type of George H. Crosby and John A. Savage are working along sane and conservative lines. The policy is shown in the case of the development of the town of Crosby. Of course Crosby has its "white way". A new mining town in the Lake Superior district must have its "white way", but in Crosby there is nothing of the extravagance displayed at Hibbing and other mining towns. Crosby promises to be a very pretty and comfortable city in an important mining center. Mr. Savage has a high grade bessemer mine. The Inland Steel Co. and other companies have valuable properties.

On the whole, we believe that the Cuyuna has a bright future, but investors should be exceedingly cautious in investigating before buying any stock in Cuyuna properties. They would do well to read the recent bulletin of the Minnesota School of Mines on "Preliminary Concentration Tests on Cuyuna Ores" and carefully peruse other documents relating to the Cuyuna deposits, including the report of the Minnesota tax commission.

Banking and Foreign Trade

HOW England and Germany had established themselves commercially in many markets through the co-operation of powerful banking auxiliaries, has been made familiar to the business world in this country in recent months, especially in the consideration and investigation of the South American markets. Liberal credits have been one phase of this system and they have been an important influence in gaining trade; more efficacious, however, has been the financing of various business enterprises in foreign lands through the money resources of these two great exporting countries. When a railroad or a manufacturing plant or any other line of business enterprise was established through such means, the initial and continued trade requirements of such propositions were assured for the English or German manufacturer and merchant, depending upon which country furnished the money and held the securities; in fact, usually it was formally arranged and reasonably so, that

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these buyers should fill their needs in the country which supplied them with the money.

The activities in international banking of England and Germany having been suspended in one case and greatly reduced in the other because of the war, the United States gradually has been rising to the occasion and meeting the extraordinary opportunity thus presented. More and more, New York City has been taking on the appearance and the realities of the world's leading money center, due not only to the nation's unimpaired resources but to their continued improvement through the flowing in of foreign gold to offset a constantly rising trade balance in our favor. Since Jan. 1, imports of gold have totaled over $63,000,000. What the American bankers are doing with these larger money supplies is shown by the increasing list of foreign loans now being made. Very recently, a $50,000,000 loan to Argentine has been made in conjunction with England. Bolivia has been favored to the extent of $1,000,000; other South American countries have been accommodated and arrangements steadily are being renewed to take up recurring issues of bonds of some of the warring countries, particularly France and Russia. These loans are believed to be but the forerunner of permanent activities of this country as an international banker.

The pertinent question hence arises, are the American manufacturers fully obtaining the material benefits from present conditions which the world has been accustomed to concede to the banker nation? Is there the close co-operation between the banking and the business interests of the country which has enabled other nations to reap so fully from their opportunities in proportion to their willingness and their ability financially to promote new foreign enterprise? The answer from the iron and steel standpoint is that the situation is developing favorably for the domestic producer. Russia's recent and contemplated large purchases of railroad supplies and equipment in this country are illustrative upon this point. At the moment Argentine has practically closed with American mills for a good tonnage of rails, the Bolivian government lines are in the market for similar material with good prospects for the order coming here and many other concrete manifestations show the progress being made in the joining of the great forces of finance and manufacture of the United States to promote the world-wide commercial supremacy of the nation in the arts of both war and peace.

Before the present war shall have ended unless some extreme situation interferes—and it is not certain that this would wholly check the movement—the position of the United States as an international banker should be buttressed by a great home supply of gold and by comparatively small funded obligations to foreign countries. The proper and intelligent application of these all-powerful advantages should and must prove of the greatest benefit in the extension of our foreign commerce in manufactured products.

Machine Tools and the War

FROM information gathered at the recent convention of the National Machine Tool Builders' Association, it may be concluded that an early peace in Europe is not in sight. It was stated, informally, that the demand for American machine tools for export is heavier and more insistent than ever; also it was pointed out that the magnitude of the contracts for shells and other munitions of war placed in this country does not indicate an early cessation of hostilities. The machine tool builders are operating their plants at the utmost limit of capacity and are behind on their orders. Night forces are the rule.

The machine tool manufacturers are giving more careful attention to the financial aspects of the business resulting from the war than they did at the outbreak of hostilities. At present, no contracts are being accepted which are subject to cancellation and the terms of payment, naturally, are becoming more and more stringent. A few months ago, the machine tool industry was satisfied to receive payment upon the delivery of the ship's papers to a bank in the United States. Now most of the business is done on a basis of payment upon the surrender of public warehouse receipts to the bank, the purchaser taking the risk of obtaining cargo space and getting the machinery safely on board the outgoing vessel. In some cases recently, full cash payments have been demanded and received in advance, and the conviction is growing that the manufacturers must thoroughly protect themselves.

Prices Present and Past

Quotations on leading products May 26, average for April, 1915, average for February, 1915, and average for May, 1914. Prices are those ruling in the largest percentage of sales at the dates named.

	Prices May 26. 1915.	Average for Apr., 1915.	Average for Feb., 1915.	Aver. for May, 1914.
Bessemer pig iron, Pittsburgh..	$14.55	$14.55	$14.63	$14.90
Basic pig iron, Pittsburgh.....	13.60	13.45	13.45	13.90
No. 2 Fdy. pig iron, Pittsburgh	13.45	13.45	13.70	14.09
Northern No. 2 Fdy., Chgo....	13.00	13.00	13.00	14.25
Lake Superior Charcoal, Chgo..	15.75	15.75	15.75	15.75
Malleable, Bessemer, Chgo.....	13.00	13.00	13.00	14.25
Southern No. 2, Birmingham...	9.75	9.50	9.50	10.50
Southern Ohio No. 2, Ironton.	12.50	12.75	12.75	13.50
Basic, eastern Pa.....	13.25	13.25	13.50	14.00
No. 2X Virginia furnace.....	12.50	12.50	12.50	12.75
No. 2X foundry, Philadelphia..	14.25	14.25	14.25	14.75
Ferro mang., Balt., (prompt)..	100.00	100.00	68.00*	38.00
Billets, Pbgh.	19.00	19.50	19.50	20.00
Sheet bars, Pbgh.....	20.00	19.60	20.00	21.00
Steel bars, Chicago.....	1.39	1.38	1.31	1.29
Steel bars, Pittsburgh.....	1.20	1.20	1.10	1.15
Iron bars, Philadelphia.....	1.17	1.125	1.12	1.22
Iron bars, Cleveland, local del'y	1.20	1.20	1.15	1.25
Iron bars, Chgo. mill.....	1.15	1.15	1.15	1.10

*Nominal.

	Prices May 26. 1915.	Average for Apr., 1915.	Average for Feb., 1915.	Aver. for May, 1914.
Beams, Chicago	$1.39	$1.36	$1.31	$1.29
Beams, Pittsburgh	1.20	1.154	1.10	1.15
Beams, Philadelphia ...?.....	1.359	1.30	1.25	1.25
Tank plates, Pittsburgh.....	1.20	1.11	1.10	1.125
Tank plates, Chicago.....	1.29	1.28	1.27	1.29
Tank plates, Philadelphia.....	1.359	1.30	1.25	1.25
Sheets, blk., No. 28, Pittsburgh	1.80	1.80	1.80	1.87
Sheets, blue an., No. 10, Pbgh.	1.35	1.30	1.30	1.37
Sheets, gal., No. 28, Pbgh.....	3.60	3.30	3.01	2.80
Wire nails, Pittsburgh.....	1.55	1.59	1.55	1.57
Connellsville fur. coke contr...	1.65	1.65	1.65	2.00
Connellsville fdy. coke, contr...	2.25	2.25	2.25	2.50
Heavy melting steel, Pbgh....	11.75	11.90	11.55	12.00
Heavy melting steel, east'n Pa.	11.50	11.25	10.50	10.75
Heavy melting steel, Chgo.....	9.25	9.30	9.44	9.94
No. 1 wrought eastern Pa.....	12.50	12.50	12.00	12.50
No. 1 wrought, Chgo.....	8.75	8.55	8.88	8.63
Rerolling rails, Chgo.....	10.00	9.85	9.62	11.25
Car wheels, Chgo.....	9.75	9.80	10.00	11.38

(For Additional Prices See Page 1084.)

Pig Iron Shipments Satisfactory

But Sales Are Light and in Some Centers Prices Show a Tendency Toward Weakness

Buffalo, May 25.—The furnaces of the Buffalo district are receiving steady and increasing specifications for iron under contract. While the melters show little disposition to come into the market for inquiries or purchases for advance requirements, the gains in the volume of specifying indicate an encouraging increase in consumption.

There are a number of instances coming up where foundries in ordering out iron under contract are anticipating on the shipments to them. Producers report that some of the users are now taking their July or the first part of their last half quotas.

The recent record placement in this territory covered practically all of the users for current and nearby needs, so that the furnace interests at this time are not looking for any considerable volume of buying. The evidences of recovery of foundry activity appearing throughout the territory, as shown by the increased consumption of iron may change this situation.

With 10 of the 12 merchant stacks of the Buffalo territory in blast, virtually little or no iron is being piled on the furnace yards, as it is going forward practically as rapidly as it is being produced.

The stack of the Canadian Furnace Co., Ltd., at Port Colborne, Ont., has been in commission now for over two months and practically its entire production is being shipped as produced. This furnace had a large quantity of iron piled on its yards earlier in the year.

There is no change in prices from the level quoted a week ago. A spread of $1 covers the range from the minimum on low grades to the maximum being quoted of the high silicon irons, namely $12.50 to $13.50 for delivery over the remainder of the year, with an absence of grade differentials.

Melt is Improving

New York, May 25.—If the iron market in this district possesses any especial feature at the moment, it is the way in which some consumers are ordering in iron not yet due, or are making additional purchases after they had proclaimed that their forward needs were filled comfortably. The fact that these evidences of inadequate supplies are coming from different directions seems to indicate that the melt in general continues to improve gradually. At this time, probably 5,000 to 6,000 tons of inquiry are pending and this is made up of comparatively small quantities. A Cartaret, N. J., buyer asks 500 to 1,000 tons of No. 2X; a Jersey City shop 500 tons of No. 1X for shipment this year, or 1,000 tons of similar grade for delivery a year from date; an Alabama car wheel maker, 800 tons of foundry which is being bought in this city; and smaller lots. Another inquiry for 1,500 to 2,000 tons of mixed grades is pending in this territory. While price policies with most producers have remained unchanged, some low figures appeared at tidewater points on eastern Pennsylvania brands within the week. A Paterson, N. J., buyer closing for 450 tons of foundry for forward shipment, paid $13.90, delivered, for 1.50 to 1.75 silicon iron and $14.25, delivered, for No. 2X. A Hoboken shop bought 400 tons. The inquiry for 3,000 tons of foundry for a Hyde Park, Mass., buyer is unsettled and sellers are not expecting early action. The export market on pig iron has continued quiet. An inquiry for 1,500 to 2,000 tons of foundry and hematite for Europe seems likely to be closed soon. Another new inquiry for 1,000 tons of foundry for Italy, is pending.

Market Quiet on Small Sales

Philadelphia, May 24.—Sizable buying is generally absent in the pig iron market in this territory and trading remains monotonous and uninteresting.

(*For complete prices see page* 1084.)

Small orders still rule and it is pointed out with satisfaction by sellers that some consumers who considered themselves fully covered, have been placing supplemental quantities. It is to be noted that some eastern Pennsylvania makers have shown a keener need of orders the past week by dipping under prevailing prices and in one case banking of the furnace has been adopted as a means to check an accumulation of stock. The Norfolk & Western railroad has closed for about 3,500 tons of foundry and bessemer against its recent last half inquiry for Roanoke and several hundred tons of charcoal still are pending. The foundry iron went to Virginia and the malleable to Ohio makers. Pipe foundries have made further purchases. An Emaus, Pa., shop has taken 1,000 to 2,000 tons of eastern Pennsylvania lower silicons, increasing its recent purchases to 4,000 to 5,000 tons, most of which was secured at about $13.25, delivered. Standard foundry prices hold around $14.25; Philadelphia, for No. 2X. In some instances, this level is shaded. In Virginia, No. 2X is freely available at $12.50, furnace, with some irregularity due to concessions in analysis by certain makers. Steel-making iron is dull. Some special negotiations with buyers of basic nearby this district are approaching conclusion. Basic is nominal at about $13.50, delivered. Low phosphorus demand is very limited. One of the Hokendauqua furnaces is being banked.

Inquiry for Steel-Making Grades

Pittsburgh, May 25.—Some quiet inquiry for steel-making grades of pig iron, including one lot of 10,000 tons, is pending and scattering tonnages have been sold the last 10 days at prevailing quotations. Several prominent sellers of basic are declining to offer this grade at the prevailing price, $12.50, valley. Foundry grades are selling at a range from $12.50 to $13, valley, and gray forge is listed at $12.25, valley. The Carnegie company is blowing 40 stacks, having applied the torch to one of the Isabella group the latter part of last week; in December this company was operating only 23 of its 59 blast furnaces. The Clinton Iron & Steel Co. has blown in its Clinton blast furnace.

Best Since November

Cleveland, May 25.—While no noteworthy sales of pig iron are being made, small tonnages in considerable numbers are being taken and shipments are holding up well. One important firm has sold more iron this month than in any month since last November.

Silveries Sell Best

Cincinnati, May 24.—The pig iron market is extremely quiet. The only redeeming feature is that shipments on old contracts are going forward in a satisfactory manner, and that stocks in furnace yards are not increasing. Only a small tonnage of foundry iron was sold in this territory last week, the larger part of the few sales made being malleable and silvery iron. Silvery iron is more active than any other grade, and a few tentative inquiries are out for delivery through the last half. It is quoted at from $14.75 to $15, furnace, but a small amount might be had by desirable buyers at $14.50, furnace, for cash payment. Malleable inquiry, which was good two weeks ago, has dwindled down to a minimum. Southern No. 2 foundry is quoted at from $9.75 to $10, Birmingham basis, for the last half, while a small amount can still be had from a Tennessee furnace at $9.50, Birmingham basis, for prompt delivery and when spot cash can be paid. Southern Ohio No. 2 foundry is very quiet and unchanged at from $12.50 to $12.75, Ironton basis, for the last half.

Inquiry Lighter

Chicago, May 25.—Most sellers of pig iron find inquiry much quieter than was the case a fortnight ago. At that time, large users were in the market for considerable tonnages which for the most part were satisfied and then followed a week with small users inquiring for correspondingly smaller tonnages, but the present week finds a much smaller tonnage under consideration. Restraining factors in the business world dependent on possible international complications seem to have caused a lull keenly felt among pig iron sellers. Northern iron is firm at $13, Chicago furnace, for No. 2 foundry and malleable and the only strengthening in the situation is determination to insist on premiums for added silicon. That this is being adhered to is evidenced by sales sheets and in this respect considerable strength has been added.

All sellers are disposing of some iron continually and are much better situated as to tonnage in relation to active capacity than for some time. In fact, it is likely additional capacity will be blown in before July 1 in this territory.

A Muskegon maker of automobile castings closed recently for about 3,500 tons of iron, a portion of which was Jackson county silvery and the remainder foundry iron. The southern foundry iron was bought at $9.50, Birmingham, for No. 3 analysis. The northern foundry was taken by a Detroit stack. Some additional activity is noted among malleable melters, a large Chicago melter having closed recently for about 5,000 tons to be delivered from a Chicago stack and a Racine melter taking 1,000 tons of malleable which will be supplied from another merchant stack in this city.

While southern iron is firm at $10, Birmingham, for last half delivery, No. 2 foundry may be obtained for immediate delivery on a basis of $9.75, Birmingham.

Fair Buying

St. Louis, May 24.—Considerable buying of pig iron was done in this market last week in small lots, the largest being 500 tons of northern iron. The inquiry out today is practically nothing, and sales agents are not impressed with the outlook for better conditions within the near future. Southern No. 2 is quoted at $10, Birmingham basis, but there is little doubt that this figure could be shaded. Northern prices are unchanged.

Prices Strong

Birmingham, May 24.—Pig iron in the local market for last half delivery is strong at $10 for No. 2 foundry. Spot iron can be bought at $9.75.

While the market is strong and fairly active, it has been without feature. Inquiry remains about all that operators seem to expect and three of the large makers claim they have already sold in May more than their make. Sales for the month will not be nearly as heavy as April, unless a marked change occurs, the total for the month now being estimated at around 100,000 tons.

(For complete prices see page 1084.)

Fifty Years Old

The F. W. Heitmann Co., Houston, Tex., is sending out announcements of the fiftieth anniversary of the founding of its business. In 1865, F. W. Heitmann formed a partnership and the firm of Allen & Heitmann was established on the same block which the present company occupies. Upon the retirement of Mr. Allen, the original firm was succeeded by that of Fox & Heitmann, which continued until 1876, when it was succeeded by the F. W. Heitmann Co. The founder of the business, F. W. Heitmann, died in 1889, when his son, F. A. Heitmann, the present manager, took charge. The business has advanced steadily, keeping pace with the progress of the great state.

Huge Orders for Steel Bars

Placed and Pending for Manufacture of War Materials —Prices Generally Maintained

Cleveland, May 25.—An inquiry for 135,000 tons of 3-inch rounds for the manufacture of shrapnel for the English army has been received by a Cleveland mill and a price will be made on a part of the tonnage. Owing, however, to the fact that mills are now in a very comfortable position in regard to bar tonnage, they are not disposed to take on large orders for foreign shipment. This proved true in the case of an inquiry for gun steel, reported in these columns last week. It is understood that a high price was made by a Cleveland company and that the business is not likely to come to this city. The inquiry for rounds is, however, more attractive and is receiving careful consideration. Agricultural implement manufacturers are contracting in a conservative way at 1.20c, Pittsburgh, for delivery up to Jan. 1.

War Orders Predominate

Pittsburgh, May 25.—The placing of huge orders for war material continues, and indications are that manufacturers of rounds and other forms of steel that can be converted into shells, rifles, etc., will operate departments at maximum capacities until the end of the European conflict. Details of many orders are not announced for obvious reasons and so many conflicting reports are heard that it is difficult to offer reliable information. The Carnegie Steel Co. is rolling about 17,000 tons for the Dunkirk, N. Y., works, and 9,400 tons for the Richmond, Va., works of the American Locomotive Co., which, as previously reported, recently received a large order from the allies. The Westinghouse Air Brake Co. and the New York Air Brake Co., both of which have booked additional contracts for war material, have practically concluded negotiations for the steel involved, but no official information concerning the extent of the contracts has been offered. The Westinghouse Electric & Mfg. Co. is understood to have ordered steel for about 1,000,000 rifles for Russia. Steel bars are firm at 1.20c for prompt and 1.25c for third quarter shipment.

Some Bar Shading Reported

Philadelphia, May 24.—Several tonnage lots of steel bars remain unplaced in this district. The Bethlehem Steel Co. has issued supplemental specifications in connection with its recent inquiry for 10,000 tons of 3½-inch rounds. These bars now are to be annealed and are to be delivered 1,000 tons monthly, beginning July. Another manufacturer who asked 5,000 tons of rounds has bought a test lot of 100 tons from a lake mill. The Baldwin Locomotive Co. inquiry for rounds is unacted upon. Some talk of price shading has sprung up in the merchant steel bar market in this district where it is said a western Pennsylvania maker, to introduce the product of a new mill, has made concessions from the acknowledged 1.20c, Pittsburgh base price, for second quarter. This development has not been very disturbing, but it has resulted in other makers meeting these cuts in certain cases. The market displays considerable new business and specifications are good. Delivery promises of some mills are not quite so good. The Jones & Laughlin Steel Co. is low on the large part of a miscellaneous lot of 1,000 to 1,500 tons, chiefly bars, for the Panama canal, bids for which went in a few days ago. This maker also has taken some smaller bar lots for Panama. The Virginian railroad placed 200 tons for third quarter and an inquiry for 175 tons of reinforcing bars for Baltimore shipment is out. Prompt and second quarter bars usually are quoted at 1.359c, Philadelphia, or 1.20c, Pittsburgh. Contracts for third quarter continue to be placed quite freely at 1.25c, Pittsburgh, and these are including some of the farming implement trade in eastern Pennsylvania.

Distribution of Rounds

New York, May 25.—Further details regarding the distribution of the 27,000 tons of steel, chiefly rounds for shells by the American Locomotive Co., which was closed last week, as stated by *The Iron Trade Review* at the time, now are available. The Carnegie Steel Co. will furnish about 18,000 tons of this material, including 9,400 tons of 3½-inch rounds of 5¼-inch lengths for Richmond, Va., delivery, and 8,600 tons of similar diameter and of 10¼-inch lengths for Dunkirk, N. Y. The Lackawanna Steel Co. also will supply 8,600 tons of the same class of material for Dunkirk. About 1,500 tons of other steel were placed. Delivery on this steel extends up to May, 1916. The Carnegie Steel Co. also is expected to supply the 12,000 to 15,000 tons of rounds required by the New York Air Brake Co. for its shell contract. Little is known in this territory regarding the disposition of a similar tonnage for the Westinghouse Air Brake Co., which is being closed at Pittsburgh. Another lot of 5,000 tons of shrapnel bars has been closed with an independent maker for shipment to France and further negotiations, both for delivery to domestic and foreign buyers, continue.

It is learned that the larger implement manufacturers have not as yet accepted the proposition of the mills to cover them on steel bars only for the last half of the present year at 1.20c, Pittsburgh, and that they are making a strong effort to induce makers to grant them the usual full-year contract. Local specifications for bars are good. Prices remain 1.369c, New York, or 1.20c, Pittsburgh, for second quarter, and $1 higher for third quarter.

Inquiry More Active

Buffalo, May 25.—The steel bar market in the Buffalo territory is reported good. Inquiries are picking up to some extent for carload lots and up to 150 tons and over. Specifications for material under contract continue to be steady and the shipments for the month have failed to keep up to the volume of specifications. The demands on the mills are not for forward shipments but with the urgent request that the material specified be forwarded at the earliest convenience of the mills, indicating that the material is going direct into consumption and not into stock. Prices remain firm at 1.20c for current quarter; 1.25c, base, for third, and for the most part, 1.30c for last quarter.

Steel Bars Remain Firm

Chicago, May 25.—Continued strength characterizes the market for steel bars and business at present is being done on a basis of 1.39c, Chicago, for immediate delivery, and 1.44c, Chicago, for third quarter. The only exception to the third quarter price is a concession of $1 per ton to agricultural implement makers and the smaller consumers in this line are contracting for their requirements through last half at 1.39c, Chicago. Larger agricultural implement makers continue to be interested in the market, but have not yet reached the point of closing their contracts. The discussion as to length of contracts appears to have resulted in six months being established and makers seem to have gained their point.

Bar Iron is Dull

Chicago, May 25.—Makers of bar iron all appear to have raised their

(*For complete prices see page* 1084.)

prices to 1.20c, Chicago, but almost no new business is being taken at this price. Most users of iron bars are covered to July 1 and are specifying their tonnage regularly, so that comparatively little iron remains to be placed at the new quotation. No shading has been noticed and the market appears to be steady at the new level.

Hoops, Bands and Shafting

Pittsburgh, May 25.—Cold rolled shafting shows some improvement. Makers are adhering to the 68 per cent off quotation for future delivery, but lower prices prevail for immediate acceptance. Specifications for hoops and bands are described as rather satisfactory and prices are firm.

Billet Inquiry

Comes From France, But Freight Rates Are Prohibitive

Philadelphia, May 24.—France has been among the latest foreign countries to put new inquiries for billets before eastern Pennsylvania mills. The freights quoted, which were around $20 a ton, however, have made any business out of question. The export market on billets with eastern Pennsylvania makers has been quieter the past week. Some inquiry remains current. Domestic sales remain small. A Richmond, Va., consumer still figures on 500 tons of billets. Prices are unchanged at $21.56 to $22.06, Philadelphia, for rolling and at $3 or more higher for forging steel.

Stronger at Pittsburgh

Pittsburgh, May 25.—Billets and sheet bars have reflected moderate strength the last two weeks. The Carnegie Steel Co., as previously reported, is out of the market for both products and other makers are not pushing sales for future delivery. Billets appear to be quotable at a spread from $19 to $19.50, Youngstown, and sheet bars are being held at a range from $19.50 to $20, Youngstown, or 50 cents a ton above previously prevailing quotations. No direct line on the position of the market at Pittsburgh is obtainable because of absence of sales. Muck bar is listed at $27 and wire rods at $25, Pittsburgh.

Nuts, Bolts, Rivets

Pittsburgh, May 25.—Moderate improvement in demand and a stiffening of prices is reported by sellers of nuts, bolts and rivets. The placing of contracts for cars and demand for material for export have relieved the situation to a considerable extent.

Sheet Deliveries Extended

On Account of Heavy Specifying—High Price of Spelter Still an Important Factor in the Galvanized Market

Pittsburgh, May 25.—The high price of spelter has driven some consumers out of the market. Competition between makers of galvanized sheets is limited to a comparatively few interests. Material has been sold at 3.60c for No. 28 gage, and that figure appears to be representative. Black sheets, on the other hand, show irregularity, and sales at less than 1.80c are reported. The by-monthly examination of sales sheets to determine wages in plants controlled by the Amalgamated Association showed an average realized price on Nos. 26, 27 and 28 gage plain steel sheets, f. o. b. mill, Pittsburgh basis, of 1.7086c in March and April. Sales sheets of the Brier Hill Steel Co., Youngstown; the National Enameling & Stamping Co., East St. Louis, and the Newport Rolling Mill Co., Newport, Ky., were examined. Car builders, furnishing equipment for the Pennsylvania lines, informally have placed contracts for the steel involved. Freight cars for Russia, mentioned elsewhere, require heavy tonnages of sheets.

Sheet Deliveries Extend Slightly

Philadelphia, May 24.—Sheet buyers have continued to order in material so freely from eastern Pennsylvania mills that it has had the effect of stretching out deliveries for a few days and makers are selling for forward delivery, more cautiously. A considerable part of the active demand is coming from manufacturers of automobiles and of automobile bodies. Stove makers also are specifying. Record large orders for heavy sheets which arose in connection with the Pennsylvania railroad's recent order for freight cars, now has been increased by about 1,500 tons, which will be required for the steel coaches just distributed. Sheet prices with eastern mills are steady at 1.459c to 1.509c, Philadelphia, or 1.30c to 1.35c, Pittsburgh, with No. 10 gage blue annealed. The lower price is less in evidence.

Refuse to Quote

Buffalo, May 25.—Producers and agencies of the Buffalo district report that the increase in the price of spelter has caused some of the manufacturers of galvanized sheets to withdraw quotations from the market applying to future contract requirements. Salesmen have to submit specifications to the mills before quotations will be made and in many instances the sheet mills are not disposed to quote at all.

Steadily Advancing

Cincinnati, May 25.—Galvanized sheets are advancing slowly. Prices today are being made only for prompt delivery, and one large rolling mill is out of the market entirely on this grade, because of the uncertainty of spelter. For contract delivery, one mill is asking 3.85c, Pittsburgh, for No. 28 gage, and 3.65c, Pittsburgh, for immediate shipment. Makers state that the price will be 4c, Pittsburgh, for 28 gage by July 1. Black sheets are steady at from 1.80c to 1.85c, Pittsburgh, and are selling in fair lots for both spot and contract deliveries.

Withdraw from Market

Cleveland, May 25.—A number of Ohio manufacturers of galvanized sheets have withdrawn from the market on account of the very high price of spelter and are positively declining to name any price. Others who have limited stocks on hand are quoting 3.60c, Pittsburgh, on No. 28. Black and blue annealed prices are firmer and 1.80c for No. 28 black and 1.35c for No. 10 blue annealed, Youngstown mill, are apparently the minimum quotations, except possibly on very attractive business.

Unchanged at Chicago

Chicago, May 25.—Sheet prices have not undergone a change in this market, the leading independent maker continuing the quotation of 4.19c, Chicago, for No. 28 gage galvanized, without any desire to take business even at that price. Eastern makers represented here are taking business on a basis of 3.60c to 3.75c, Pittsburgh, but not much galvanized is being sold, as brokers with contracts are taking whatever is floating, specifying it out on their contracts and pocketing a pleasing profit. Black sheets are unchanged at 1.89c to 1.94c, Chicago mill, with demand light.

Tin Plate Sags

Pittsburgh, May 25.—The average price of tin plate for the by-monthly period, ending April 30, was $3 per 100 pounds for base size, it developed at the examination of sales sheets to establish wages for May and June in

(*For complete prices see page* 1084.)

mills controlled by the Amalgamated Association. Sales sheets of the Trumbull Steel Co., Warren, O., and the National Enameling & Stamping Co., East St. Louis, were examined. Tin plate mills are operating at capacity. The American Sheet & Tin Plate Co. is driving tin plate mills at about 95 per cent and sheet mills at about 73 per cent of capacity.

Lake Ore

Is Selling Very Slowly—Some Demand for Manganese.

Cleveland, May 25.—Sales of Lake Superior ore are being made very slowly. A block of 30,000 tons of non-bessemer was sold yesterday. About the only lake ore taken by eastern furnaces is manganese, for which there is unusual demand, owing to the prevailing scarcity of ferromanganese.

The movement of ore from upper lake docks is rather slow, and it is believed that large tonnages are being held for shipment from the mines after the reduced freight rate goes into effect on June 1.

Ore From New Brunswick

Philadelphia, May 25.—About 4,000 tons of New Brunswick iron ore have been included among the arrivals at this port the past week. This ore has been brought in by two British vessels which were being transferred through the Welland canal from lake to ocean traffic in order to participate in the remunerative rates now prevailing in the over-seas trade. The New Brunswick ore is a high silicon material containing about 48 per cent of iron. Swedish ore deliveries are better, about 30,000 tons having come in this month to date. Cuban and Chilean shipments continue of about the same tonnage as recently. The lack of interest among eastern buyers of ore continues.

Wire Mills Smash Records

Pittsburgh, May 25.—Some wire mills in the Greater Pittsburgh district are breaking production records, but prices remain low and unattractive. Foreign interests continue to figure prominently in the market for all grades of material. Shipments of nails and barb wire to Italy the last few months have been heavy, and it is not improbable that much of the material shipped to Mediterranean sea ports will be used for war purposes. Wire nails are selling on the basis of $1.55 a keg. Purely domestic demand continues light, but is more satisfactory than a month ago.

Car Plates Are Active

Round Tonnages Placed to Cover Recent Railroad Orders —Three More Boats Placed With Eastern Yards

Philadelphia, May 24.—Car plates have been attracting the interest of eastern Pennsylvania mills during the past week and it now is understood that the American Car & Foundry Co. has closed for about 20,000 tons, including 10,000 tons of universal plates to cover the Pennsylvania railroad cars to be built at Berwick. The business is credited to a leading Pittsburgh maker at a price made under a former option which was lower than eastern makers would entertain. The week's contribution to the ever-lengthening list of ship awards to Atlantic yards was three boats. Two of these are of the passenger type for the Mexican Navigation Co. and went to the Wm. Cramp & Sons Ship & Engine Building Co., Pittsburgh, which will supply the approximately 4,000 tons of steel required. The other, concerning which few details have been learned, went to the New York Ship Building Co. These latest contracts increase the total eastern ship awards to 35. In the export market, Italy has inquired from eastern mills for about 6,500 tons of plates for four vessels. Other branches of the market than ship building continue to make a good showing in a miscellaneous way and eastern mill operations are steady at 75 to 85 per cent of capacity. The Norfolk & Western railroad is asking 1,000 tons of plates for last half. While car plates, as is usually the case, went at a low figure, the general price level on plates remains 1.359c, Philadelphia, or 1.20c Pittsburgh, and not much shading is reported.

Elevated and Vessel Work

New York, May 25.—About 5,800 tons of plates are expected to be furnished to the fabricator by the Carnegie Steel Co. for the section of the Culver elevated railroad line in Brooklyn upon which the Oscar Daniels Co. is the low bidder. Plate makers have been bidding upon some round lots of car steel within the week, notably those for the American Car & Foundry Co., which were placed in this city. Announcement is made that the Clyde Steamship Co., which was negotiating with Atlantic ship yards for three vessels for coastwise trade, has been obliged to place these boats with the Great Lakes Engineering Works, Detroit, because it could not get the desired deliveries in the east. These vessels are of the single screw type of about 2,500 tons gross register each and will be ready for the winter service. They will require 3,000 to 4,000 tons of plates. Except on the very large lots, such as car plates, where about the usual concessions have been made, 1.369c, New York, or 1.20c, Pittsburgh, represents the usual market quotation for prompt or second quarter.

Car Buying Continues

Pittsburgh, May 25.—The Pennsylvania lines, which last week concluded negotiations for 14,043 freight cars of several types, have awarded contracts for 189 passenger cars for the lines east and west of Pittsburgh. Fifty-six cars will be built at the Altoona shops for the lines east and 90 cars of the remaining 133 will go to the eastern division. Orders were distributed as follows: The Pressed Steel Car Co., 47; the American Car & Foundry Co., 20; the Pullman Co., 12; the Standard Steel Car Co., 39; the J. G. Brill Co., 15; the Altoona shops, 56. The active car buying movement has tended to strengthen the market for finished products, but plates are obtainable at 1.15c for immediate acceptance.

Boats for Lake Yards

Cleveland, May 25.—The Great Lakes Engineering Works, Detroit, has taken orders for three steamers for the Clyde Steamship Co., New York, and for one steamer for Passolt & Co., foreign shippers, the last named to be built at the Ashtabula yard. This makes five steamers for the coast trade taken by the Detroit company since the first of the year. About 6,000 tons of shapes and plates will be required for the five boats. Prices of plates are firmer in this district and the usual quotation is 1.20c, Pittsburgh, for the present quarter, although the 1.15c price has not entirely disappeared. A contract for shapes and plates for a job to be fabricated for shipment to France has been placed. The company which took the contract declines to give details for publication.

Plates Continue Weak

Chicago, May 25.—Steel plates are still available at 1.29c, Chicago mill, demand remaining weak and nothing appearing in conditions surrounding them to cause an increase in price.

(*For complete prices see page* 1084.)

English Ferro is Higher

Pending Definite Developments as to the Opening of the Dardanelles, the Outlook is More Serious

New York, May 25.—English ferro-manganese now officially is quoted at $100, seaboard, for such deliveries as the makers are able to ship. This price was authorized within the week by the producers in quoting upon some lots put up for their consideration by the agents in this country. Small sales at the new figure have been made. It is apparent, however, that the English makers are inclined only to sell sparingly under present conditions, even at the new price, as they are requiring that the agents submit all inquiries for final acceptance.

At $100, seaboard, English ferro-manganese is selling at $32 a ton above the price prevailing when the embargo was established by the British admiralty in November. The latest price represents an advance of $12 a ton over the figure withdrawn by the sellers on May 14. These sharp rises continue to be attributed to the desire of the English producers to conserve their stocks and ore supplies, at least pending the outcome of the Dardanelles operations and the reopening of the Russian manganese ore supply. The uncertainties surrounding the Dardanelles operations, apparently, are a large factor affecting the position of consumers of ferro-manganese in this country. Until some definite result is achieved there, the situation promises to continue doubtful and unsatisfactory for the users. While the recent arrivals of 10,000 to 15,000 tons have eased the situation considerably, it is realized that they represent only a small part of the obligations to consumers. Some English makers to date have delivered in this movement less than one-fifth of their contract tonnage. No further arrivals are announced the past week, but some shipments under May licenses are expected within a few weeks.

That some consumers of ferro-manganese still are in a more or less anxious condition is shown by the increased number of inquiries of the 200-ton and less variety placed before sellers within the week. These total about 1,000 tons. One export inquiry for 200 tons is out. It is probable that the advance on forward metal will elevate considerably the $100, furnace, price, which some sellers in this country have been making on prompt material. Ground and lump ferro-manganese also is higher with 6½ cents per pound at the plant now about the minimum.

Continued purchases of domestic spiegeleisen are being made by steelmakers and additional transactions of this kind total 1,000 to 1,500 tons. The price for domestic spiegeleisen remains about $26 at the furnace, for 20 per cent, but it is known this figure has been shaded sharply in quotations on large lots. Bessemer ferro-silicon as quoted in the east is higher by 50 cents or more and $16.50, Ohio furnace, for 10 to 11 per cent now appears minimum.

Ferro Future Uncertain

Pittsburgh, May 25.—Ferro-manganese dealers of Pittsburgh are anxiously awaiting detailed information about this alloy. No sales of importance have been made recently and no direct line on the market is obtainable. Demand for other alloys is fairly heavy, but slight irregularity continues to feature lower grades of ferro-silicon. Makers of special steel products are specifying to the full extent of contracts and deliveries are deferred in a number of instances. The abnormal demand for war material has augmented activity in the alloy market.

Cast Iron Pipe

Considerably Higher Prices Asked for Forward Deliveries

New York, May 25.—On the large Salem, Mass., letting, the Donaldson Iron Works submitted the lowest figure of $22.70, delivered, on the first lot of 5,533 tons of 36-inch. On the second inquiry for 7,535 tons of 6-inch, R. D. Wood & Co. quoted $22.84, delivered, for shipment by July 1; $24, delivered, for shipment between July 1 and Dec. 1, and $25, delivered, for shipment between Dec. 1 and April 1, 1916. The United States Cast Iron Pipe & Foundry Co. named $22.85, delivered, as its price for delivery at any time within the next several months. The action of R. D. Wood & Co. in asking considerably higher prices for forward deliveries illustrates the general unwillingness of the shops to have present quotations apply more than for a few months ahead. Philadelphia is taking bids today on about 10,000 to 12,000 tons of 6 to 48-inch, which is a contractor's letting. Woburn, Mass., is taking bids today on 500 tons of 6 to 16's and Atlantic Highlands on 160 tons of 6 and 8's; Albion, N. Y., tomorrow on 400 tons of 6 to 10's; Frederick, Md., on May 28, on 535 tons of 6 to 12's; Madrid, N. Y., on May 31 on 210 tons of 6 and 8's; Rogers McManus is the low bidder on the contractor's letting of 735 tons of 6 to 48's for New York City. While not brisk, the volume of the market is good and the tendency continues toward betterment.

(*For complete prices see page* 1084.)

Cast Pipe Slow

Chicago, May 25.—With few exceptions, business in cast iron pipe is confined to small tonnages for the lesser cities. The United States Cast Iron Pipe & Foundry Co. has been awarded 1,200 tons at Peoria Heights, Ill., which is almost the only contract closed in the past week. A contract has been awarded for 300 tons at Area, Ill., but the business has not been placed with a foundry. Bids will be opened at Chicago May 28 on 2,300 tons.

Reduced Rate

Birmingham, Ala., May 24.—Rates from Birmingham to the Pacific coast on cast iron pipe and fittings have been reduced by the Missouri Pacific railroad company $2 per ton, the old rate of $13 being changed to $11, according to advices received by local representatives of the line.

The railroad asked the lower rate in order to meet water transportation competition via the Panama canal, it is said, and the matter has been before the interstate commerce commission for some time. Local pipe manufacturers now hope to do much business in the west heretofore difficult on account of high freight rates, orders in the states of Oregon and Washington already being under consideration, it is reported.

Pipe Contract Placed

Pittsburgh, May 25.—Aside from orders for about 34,000 tons, the National Tube Co. has taken an additional order for 6,300 tons of 16-inch pipe for a 57-mile line in Texas. Merchant pipe demand is described as satisfactory and oil country interests are more active. Boiler tubes for locomotives show more snap than previously, but merchant demand still is light.

The Corliss Carbon Co., Bradford, Pa., manufacturer of motor and generator brushes exclusively, has moved its office and stock room to the Engineering building, 114 Liberty street, New York City. The eastern district is under the supervision of a competent engineer.

Panama Scrap is Offered

Bids Will Be Received at Washington on 27,000 Tons of Various Grades—Some May Go to Italy

Philadelphia, May 24.—Bids will be opened June 7 by Panama canal authorities at Washington on 27,000 tons of various grades of iron and steel scrap which have been accumulated at the isthmus. Prices are asked either f. o. b. dock or lighter, New York, or f. o. b. Colon. The Panama canal scrap offered includes 6,000 tons of rails, 4,700 tons of heavy cast, 2,100 tons of mixed, 1,400 tons of No. 1 wrought, 1,300 tons of shearing stock, 1,800 tons of structural steel, 1,000 tons of light sheets and other miscellaneous grades. The suggestion has been made in the trade that this material may be bid in by operators to satisfy large inquiries from abroad, principally from Italy. There has been no modification of the quiet scrap market in eastern Pennsylvania. Some further sales of heavy melting steel have been made at $11.50, delivered. There is more inquiry for heavy cast, which is being more closely held. Some holders ask $13, delivered eastern Pennsylvania. An additional sale of steel axles for the British Isles has been made at a higher figure or on the equivalent of about $15.50, delivered eastern Pennsylvania.

Drifting in East

New York, May 25.—The scrap market appears to be drifting and has little tone. There is practically no urgent buying on the part of consumers, neither are holders pushing sales. A sale of 500 tons of heavy melting steel at $10.50, delivered, Bethlehem, is reported but this was a local transaction as the material is to come from a nearby point. The usual quotation on No. 1 heavy steel remains $11 to $11.50, delivered eastern Pennsylvania works. Pittsburgh remains indifferent to offers of eastern scrap. The opinion is expressed in the trade that the entrance of Italy in the war probably will hold up the buying of scrap in this country because of shipping difficulties.

Buffalo Market Active

Buffalo, May 25.—Heavy melting steel, cast scrap and old car wheels have figured prominently in the trading of the past week, resulting in the movement of a large tonnage of old material. The principal local consumer came into the market for a considerable tonnage of heavy melting steel purchased at 11.50c per gross ton, f. o. b. Buffalo. The limited available tonnage of old car wheels at a price of 10.75c to 11.25c has kept down the total volume of sales of this line.

Sales of cast scrap were made at $11, advancing the price to $10.50 to $11, and inquiries are appearing for additional tonnages at the advanced figures. The demand for clean cast borings is good, causing prices to advance 25c per gross ton to $6.75 to $7.

Awaits Developments

Pittsburgh, May 25.—Iron and steel scrap dealers are more sanguine about the future. Heaviest consumers are under cover, but most of them show greater interest in the future situation. Just as soon as mill operations are increased to any great extent, demand for old material probably will become heavy and prices are expected to stiffen. There has scarcely been a ripple of excitement the last few weeks. Prices are unchanged in position, but reflect strength.

Sales Low

Cincinnati, May 25.—Sales are at a minimum, and prices, although unchanged, are weak. Demand has fallen away on all grades of iron and steel scrap, and dealers state that they are finding it difficult to sell to either rolling mills or foundries. The larger melters appear to be well stocked with supplies to run them for several months, and foundries are buying from hand to mouth in extremely small quantities. A revival of buying is not likely to occcur in the near future.

Cleveland Prices Steady

Cleveland, May 26.—The iron and steel scrap market has been unsettled the past few days, but prices have been steady. The Upson Nut Co. is taking in scrap again, the embargo having been lifted. The rolling mills are doing little buying. A fair amount of off-grade scrap is finding its way into the Cleveland territory from Michigan and Indiana. In the valleys mills are well supplied with scrap and doing little buying at present. Heavy steel, Cleveland, is quotable today $10.25 to $10.75, gross ton; valleys, $11.25 to $11.50.

Scrap Market Listless

Chicago, May 25.—Consumers of scrap in Chicago are not interested in the market. Although operations of mills are being carried on at about the same rate as had prevailed for several weeks large stocks were accumulated several weeks ago and have not yet been reduced sufficiently to require replenishment. Occasional bargains are picked up, but no demand exists and the market is entirely in the hands of buyers. Some shipments of heavy melting steel and similar grades to Pittsburgh and the valleys have been made in the past few weeks, but even this outlet is not available to any extent now.

There appears to be no let-up in the flood of railroad scrap offerings, although in some instances scrap not disposed of on one list is reappearing in subsequent offerings. Lists now before the trade include one by the C., B. & Q. railroad, containing 2,300 tons; Illinois Central, 1,000 tons; Toledo, St. Louis & Western, 600 tons; C., M. & St. P., 1,600 tons; Santa Fe, 2,400 tons, including 300 tons of No. 1 wrought and 400 tons of No. 2 wrought; Chicago & Eastern Illinois, 700 tons, including 250 tons of No. 1 wrought; Chicago, Rock Island & Pacific, 4,000 tons, including 700 tons of No. 1 wrought, 400 tons No. 2 wrought and 300 tons of No. 1 rails.

Lifeless at St. Louis

St. Louis, May 24.—The scrap iron and steel market here has been almost lifeless the past week, and while prices have not declined, except perhaps in a few transactions, the tendency is toward a lower level.

The only railroad offering this week is a list from the Chicago, Burlington & Quincy of 2,300 tons, of which 200 tons is No. 1 railroad wrought, 200 tons No. 2 railroad wrought and 250 tons of short steel rails.

Fairly Active

Birmingham, May 24.—Scrap iron shows no change in quotations and is fairly active. Dealers state business is not so good as they had expected for this month, but that there are some signs of improvement.

W. S. Horner & Co., Oliver building, Pittsburgh, have taken over the business of Goff, Horner & Co., Ltd. W. S. Horner, Pittsburgh representative of the American Rolling Mill Co., Middletown, O., is president; George S. Phillip, vice president and Harry A. Lord is secretary of the company.

The Wheeling Corrugating Co., Wheeling, W. Va., has issued two pamphlets which illustrate and describe its line of galvanized fire pails, fire bucket tanks and roofing products.

(For complete prices see page 1084.)

Shapes for Steel Cars

For the Pennsy Are Placed With an Eastern Pennsylvania Mill—Prices Are Firmer

Philadelphia, May 24.—Contracts for 8,000 to 10,000 tons of plain shapes for the construction of cars for the Pennsylvania railroad, at Berwick, Pa., have been placed with an eastern Pennsylvania mill by the American Car & Foundry Co. Structural steel requirements for the enlargement of plants manufacturing munitions of war continue to be the subject of general discussion in this district. It is known that some good sized additional orders have been placed which at present are being kept secret, including one for about 1,800 tons. Furthermore some of the orders recently placed have been enlarged. Because of the quick deliveries wanted, the pressure is so severe on the shops turning out this work that some of them are not inclined to take on additional tonnage at this time. Speaking generally, the structural market still is without important change in tenor or volume. Mill bookings are keeping up nicely due to the many small orders. Some larger prospects are in sight. It has been finally decided that the Consolidated Gas building, Baltimore, will be 18 stories and will require about 2,000 tons. Plans will be out soon. The department of the interior building, at Washington, 4,000 to 6,000 tons, also is expected soon. Apart from the purchases of car material where the usual concessions have appeared, prices seem steady at 1.359c, Philadelphia, or 1.20c, Pittsburgh.

Shapes Strong at Pittsburgh

Pittsburgh, May 25.—What has been said with reference to improvement reflected by the market for steel plates applies to structural shapes, which are being firmly held at 1.20c for second quarter delivery. Inquiries for structural steel are increasing in number and tonnages involved are fairly heavy. Drawings of the proposed bridge to be built by Allegheny county commissioners will be sent out as soon as approved by government officials; the structure will require about 11,000 tons.

Limited Lettings

New York, May 25.—New tonnage in structural steel in metropolitan and contiguous territory is being maintained, but this is due mainly to the liberal run of smaller orders. Large contracts still are comparatively few and not many of them are immediately in sight. Action on some of them which has been pending is coming more slowly and the uncertainty over national relations with Germany seems to be having some effect in temporarily checking these enterprises. Lettings of the week in this district total only about 2,500 tons. A 14,500 elevated railroad extension in Brooklyn, while unclosed, is expected to go to the American Bridge Co. Shape prices ordinarily are held at 1.369c, New York, or 1.20c, Pittsburgh, for second quarter, and deviations are confined to the very largest tonnages.

Shapes Gain Strength

Chicago, May 25.—Although demand for structural shapes has not increased largely, prices are considerably firmer and some sellers believe they are almost as strong as steel bars. However, indications are still evident that 1.39c, Chicago mill, can be shaded to some extent. Contracts let in the west during the past week total about 1,300 tons without any item being of importance.

CONTRACTS AWARDED.

American Ship Building Co., Cleveland, foundry and machine shop, 325 tons, awarded to McClintic-Marshall Co.

Research building of Rockefeller Institute, Sixty-fourth and Exterior streets, New York City, 740 tons, to Hinkel Iron Works.

Richards Garage, 110-114 West End avenue, New York City, 260 tons to Adam Happel Iron Works.

Storehouse for E. C. Hall, Brockton, Mass., 350 tons, to American Bridge Co.

Garage for Thos. Smith, 176th street and Broadway, New York City, 230 tons to Wm. Hauptman Iron Works.

Turntable for Lehigh valley, 100 tons to American Bridge Co.

Extensions to plant of Victor Talking Machine Co., Camden, N. J., 375 tons, awarded to independent shops by Irwin & Leighton, Philadelphia, general contractors.

Postoffice buildings at various locations, 350 tons, divided among Cambria Steel Co; the Gage Structural Steel Co. and the Pittsburgh Bridge & Iron Works by the Charles M. McCaul Co., Philadelphia, general contractor.

Bridge work for Pennsylvania railroad, 850 tons, Pennsylvania Steel Co. low bidder and will receive award.

Market house for Vincent Astor, Ninety-fifth street and Broadway, New York, 250 tons, awarded Hinkel Iron Works.

Addition to Wentworth Institute, Boston, 200 tons, to the American Bridge Co.

Bridge work for the Chesapeake & Ohio Northern railroad 2,000 tons, contract placed but successful fabricator not yet known.

Structural steel for elevated track work at Fort Wayne, Ind., for Pennsylvania lines west, 300 tons, awarded Riter-Conley Mfg. Co.

Leaching building Calumet & Hecla Mining Co., Calumet, Mich., 700 tons; eight leaching tanks and 18 solution tanks, 800 tons, awarded Riter-Conley Mfg. Co.

Pier No. 18 Balboa terminal, Panama canal, 1,900 tons, awarded Riter-Conley Mfg. Co.

South Sierra Power Co., riveted steel pipe for use in southern California, 400 tons, to M. W. Kellogg Co., of New York.

Yellowstone County, Montana, bridges, 332 tons.

Lake County, Ind., Strauss bascule bridge at 151st street, East Chicago, Ind., 312 tons, to Pennsylvania Bridge Co.

Swan J. Turnblad, Minneapolis, Minn., building, Minneapolis, 232 tons.

The Youngstown Iron & Steel Co., Youngstown, has awarded additional contracts for its new open hearth steel plant at Lowellville. The H. K. Porter Co., Pittsburgh, will furnish two oil burning locomotives of standard gage. The Hunter Construction Co., Youngstown, will erect a 55 x 450 foot building for a sheet bar storage structure. The Sterritt-Thomas Foundry Co., Pittsburgh, will supply soaking pit plates. The Toledo Machine & Tool Co., Toledo, will furnish two large cold steel presses and the Massillon Punch & Machine Co., Massillon, O., will supply a large punching machine. The Knox Pressed Welded Steel Co., Pittsburgh, will build a standpipe 65 feet high with a diameter of 20 feet.

CONTRACTS PENDING.

Allegheny county bridge, Allegheny county, Pa., 11,000 tons; drawings will be furnished soon by J. G. Chalsant, county engineer.

Administration building for general hospital, Boston, 300 tons, bids being taken.

High school, South Bethlehem, Pa., 350 tons; bids being taken.

Alterations to National Savings & Trust Co., Washington, D. C., 300 tons, bids being taken.

Parochial school on Shelter Island, N. Y., 280 tons, bids being taken.

Founders building for Loomis Institute, Windsor, Conn., 280 tons, bids being taken.

Two bridges for Norfolk & Western, 240 tons, bids being taken.

Passenger station at Wilkinsburg, Pa., for Pennsylvania railroad, 200 tons, for which Irwin & Leighton, Philadelphia, have the general contract, bids being taken.

Grandstand for motordrome at Sheepshead Bay, L. I., 3,000 tons; bids being taken. The Lackawanna Bridge Co. previously received 1,600 tons for track work for this job.

Section No. 2 at Gravesend avenue for the Culver Elevated railroad line, Brooklyn, 14,500 tons, Oscar Daniels Co. low bidder on the general contract; American Bridge Co. expected to furnish this steel.

Consolidated Gas building, Baltimore, plans now adopted for an 18-story structure to require about 2,000 tons; bids to be asked shortly.

Department of the Interior building, Washington, D. C., 4,000 to 6,000 tons, plans expected to be out in about a month.

Another Benzol Plant

Chicago, May 25.—The Northwestern Iron Co., with two blast furnace stacks at Mayville, Wis., is about to erect a benzol recovery plant in connection with its coke ovens sufficient to extract the benzol and toluol from the gas made by 36 ovens. The company has a contract similar to those entered into by other concerns which will care for the output for about two years regardless of continuance of the European war.

(*For complete prices see page* 1084.)

Russian Cars Not Placed

In Spite of Repeated Reports to the Contrary—Controversy About Specifications Delays Pennsylvania Rails

New York, May 25.—Questions regarding specifications have continued to delay the placing of the final lot of 138,000 tons of the Pennsylvania railroad's rail order, though early action still is promised. To meet the changes imposed in the revised specifications adopted this year by this system, rail makers have quoted an additional extra of $3.90 per ton for either bessemer or open hearth rails over the extras of 25 cents and 55 cents per ton on bessemer and open hearth respectively asked on the regular Pennsylvania railroad specifications. This means a price of $34.70, mill, per gross ton for open hearth and $32.15, mill, for bessemer rails. There is some talk that the Pennsylvania may revert to the old specifications in view of the extras quoted.

The Central Railroad of Argentine has placed 8,000 tons of rails with the Pennsylvania Steel Co. The recent order of about 20,000 tons for the Chinese Eastern railway, of which 12,000 tons went to the Steel Corporation and the balance to an independent mill, is understood to be for the eastern part of the Siberian system and is a part of the large inquiries for rails which Russia has been circulating in this country. With about 50,000 tons now placed, Russia still is in the market for a large tonnage. The Lehigh & New England has placed 1,700 tons of rails with the Bethlehem Steel Co. and 2,500 tons are in the market for New York City subway and elevated lines. Some further round tonnages of rails which are supplemental to recent contracts are on the verge of being closed in the east.

Russian Cars Not Placed

Despite repeatedly published statements, it is stated officially that the Pressed Steel Car Co. has not closed for a large block of cars for Russia. The same statement applies to a large order reported to have gone to a Seattle company. Of the large Russian car inquiry, 15,500 cars still are unplaced including about 10,000 of box and the remainder of coal types and the closing of these hinges mainly upon terms of payment and somewhat upon specifications. Some of these cars have eight wheels and some of them four wheels. As previously stated, the Russian cars closed to date include 2,000 to the Eastern Car Co., New Glasgow, N. S., and 7,000 to the Canadian Car & Foundry Co., and 1,000 to 2,000 to the American Car & Foundry Co. A report that the Nova Scotia Car Co. has 2,000 is a misapprehension since this company is identical with the Eastern Car Co.

Among domestic lines the Pennvania railroad has placed 189 steel coaches of which 55 will be built at Altoona. The Pressed Steel Car Co. received 47, including 24 passenger coaches, 12 combination and baggage, five baggage and six diners; the Standard Steel Car Co., 39, including 20 coaches, 12 combinations and seven baggage; the American Car & Foundry Co., 20 coaches; the J. G. Brill Co., 15 baggage and the Pullman Co. 12 baggage and mail cars. The Pennsylvania railroad has decided not to buy 1,000 automobile and 500 box cars which remained from its original inquiry. The Chesapeake & Ohio has placed 700 box cars under a trade with the Central Car & Locomotive Co., of Chicago. The Norfolk & Western is preparing plans for 1,000 cars. The Rock Island inquiry for 5,000 cars is held up temporarily by litigation.

The Norfolk & Western is out for 2,000 to 3,000 kegs of spikes. The Jones & Laughlin Steel Co. has taken 1,500 kegs for the Panama canal.

For North-Western Cars

Chicago, May 26. (By wire.)—The Illinois Steel Co. has received specification on 10,000 tons of shapes and plates for North-Western cars recently ordered.

Coke Regions

Will Have Labor Shortage, if Many Men Go to Europe

Pittsburgh, May 25.—The entrance of Italy into the European conflict may tend to precipitate the threatened labor shortage in the Connellsville regions. For several months, talk of a labor famine in the coke regions has been heard. Thousands of foreign-born employes returned to native lands the early part of last year and the exodus was even more pronounced immediately after the outbreak of the war. It is too early to predict how many Italians will attempt to defend their colors, but it is believed some embarrassment may be experienced if the labor supply is materially reduced. This will prove to be the case, it is certain, if operations in finishing mills are increased to any great extent. The market for furnace coke is quiet and no change in the position of prices is noted. Foundry coke consumers, with few exceptions, have covered requirements for the year beginning July 1. Several cargoes of coke have been shipped to South American points. The Conellsville *Courier* for the week ending May 15 says production was 297,554 tons, a decrease of 1,612 tons, compared with the week before.

Shortage Possible

Cleveland, May 25.—Reports from the coal regions indicate that while there is no scarcity of labor, the demand for laborers is about equal to the supply, and if the European war should cause any considerable number of workers to go to Europe, there will be a shortage. There is some contracting for foundry coke at $2.40 to $2.50, ovens, for the rest of the year.

Furnace Coke Sold

Cincinnati, May 25.—Two sales of furnace coke for last half shipment, aggregating about 65,000 tons, have been made to southern Ohio stacks. The foundry coke market is active, as foundries are now buying for next year's requirements by renewing old contracts that expire on July 1. Southern producers are blowing in more ovens, but are keeping only a sufficient number in blast to supply contracts. Pocahontas and Wise county furnace coke is quoted at from $1.75 to $2.25, ovens, and New River furnace coke at from $2 to $2.40, ovens. Wise county and Pocahontas 72-hour grades are quoted at from $2 to $2.40, ovens, and New River foundry coke at from $2.50 to $3, ovens.

Freight $50 Per Ton

New York, May 25.—A recent inquiry for 3,000 tons of foundry coke for Russia has developed ocean freights of $50 a ton to Archangel, which, apparently puts the business completely out of question. A new inquiry for 10,000 tons of smelter coke for an eastern consumer is in the market and the 4,000 tons of similar fuel for South American delivery still is open.

Several Contracts

St. Louis, May 25. — Several contracts for coke in 1,000 and 1,500-ton lots were closed last week, and several others for similar amounts are pending. Business, however, in coke is dull. Connellsville and Virginia 72-hour foundry grades are held at $2.25 to $2.50 for prompt delivery and at $2.50 on contract.

(*For complete prices see page* 1084.)

Immense Spelter Sales

Prices Advance Rapidly—Inquiries for Large Tonnages Pending—Many Producers Sold Up for Months

New York, May 25.—The past week has witnessed the transaction of an immense amount of business in spelter, and at rapidly advancing prices. Consumers manifested a fear that if they did not close without delay on their future supplies of the metal, they would not be able to get anything at all later on, and this fear, strange to say, appears to be entirely justified. The big buying movement of the past 10 days has tightened up supplies, as most producers are about as well sold up as they dare be without getting in more ore. Numerous consumers are inquiring for large tonnages of the better grades of spelter without attracting sellers; many producers are sold up on the better grades nearly through the year. On prime western, practically all producers are sold up from two to three months ahead. It is almost impossible to buy spelter of any grade for spot or prompt shipment. Inquiry on all grades for future delivery continues very active. Prices on prime western which could not be shaded now are: 18c to 18.50c, St. Louis, on any future position; 18.50c to 19.50c on prompt. Brass special is quotable at 20c to 21c, St. Louis.

The lead market is quiet, but there has been a steady demand, principally by domestic consumers, but also from abroad. The American Smelting & Refining Co. today advanced its price to 4.30c, New York.

The copper market has been qu and now is firmer after some shading by second sellers. The producers' price on electrolytic is 18.87½c to 19c, delivered 30 days. Good casting copper is held at 18.25c to 18.50c, delivered 30 days, while ordinary casting copper made from scrap can be had at 17c, cash, New York. Prime lake is held at 18.87½c to 19c, cash, arsenical lake at 18.75c to 18.87½c, cash, and the best brands of lake at about 23c, cash. Second sellers might shade these prices on small tonnages.

After having been quiet all week, the demand for tin is better today, and inquiries now out indicate that much business for the summer months is about to be placed. Spot is quoted at 38c and June and July shipment from the far east at 36.75c. June delivery can be had at about 37.50c and July at 37.12½c.

Chinese and Japanese antimony for spot shipment are quoted about 35c to 35.50c. Offers of futures continue scarce. Supplies of other brands are practically wiped out. The market is very strong.

The domestic producer of aluminum is sold up for about three months ahead on ingots. Consequently the second sellers are able to command high prices and have done 23c.

The price of nickel has been advanced and shot and ingots now are quoted at 42c to 45c and electrolytic at 47c to 50c.

Warehouse Orders

Show Decided Improvement—Galvanized Steel Prices Higher

Cleveland, May 25.—Owing to the rapid advance in the price of spelter, Cleveland warehouses have advanced their price on No. 28 galvanized sheets and are now quoting from 3.75c to 3.90c. The price until within a few days was very little above the mill quotations. Warehouse business in Cleveland shows decided improvement and indications are that the total sales for May will be considerably ahead of those for April.

Warehouses Feel Strike

Warehouses are feeling keenly the lack of demand for construction material in Chicago, due to the strike of building trades. Other lines are fairly active and the general volume of business is satisfactory, with this exception.

Although an advance in galvanized sheets from store has been expected for some time, it has not been made and No. 28 gage still is obtainable from warehouse stocks at 4c, Chicago. This price is only a trifle above the lowest made by mills and is lower than that quoted by the leading independent in this territory. Much interest is manifested in developments after present contracts expire as stocks are not large and contracts for the most part do not extend beyond July 1. Predictions are made that galvanized from store will be quoted at 4.50c, Chicago, before long.

A statement in the May 20 issue of *The Iron Trade Review* to the effect that the Federal Bridge Co., Waukesha, Wis., was preparing to manufacture a line of light steel farm tractors developed by its engineering staff, is in error. The company advises that although it has taken orders for the manufacture of tractors for certain firms, it has nothing to do with their development or sale and is not contemplating a change of any sort from its regular line of business.

Verdict in Iron Ore Contract Case

In the case of Swallow & Hopkins vs. the Iroquois Iron Co., which has been on trial at Duluth for nearly two weeks, the jury last Friday returned a verdict in favor of the plaintiff for $48,572.57. The suit was for $70,000 damages on a contract for 100,000 tons of Mesabi non-bessemer ore sold for the plaintiffs by M. A. Hanna & Co. to the defendant. After 14,000 tons had been shipped, the contract was cancelled by the defendant company on the ground that two cargoes had fallen below 50 per cent natural in iron with 14 per cent moisture. The plaintiffs claimed that only a cargo and a part of a cargo below the required analysis had been shipped and that that had been done with the consent of the defendant.

Large Attendance Expected

Indications point to a good attendance at the eighth annual general meeting of the American Iron and Steel Institute, to be held at the Waldorf-Astoria, New York City, on Friday, May 28. More than 300 acceptances to the meeting and banquet, which takes place at the Waldorf Friday evening have been received. President Gary, of the Institute, as usual, will sound the keynote on conditions in the iron and steel industry in his annual address at the opening of the meeting Friday morning.

Closed the Plant

The Seneca Iron & Steel Co., Buffalo, recently met a disturbed labor situation at its plant by shutting down its hot mills where the trouble originated and later closed the entire plant. Workers, it is claimed, questioned the discharge of several men in the hot mills department by the superintendent and were about to make a formal demand for his removal when the order to close was issued, and later became complete. The officials of the company decline to discuss the situation beyond saying that the men had no valid grievance. The shut-down is still in effect.

Clyde M. Carr, president of Joseph T. Ryerson & Son, has returned to Chicago from Santa Barbara, Cal.

Germans Expelled From Institute

Denounced at London Meeting for "Having Descended to Depths of Savagery"—President Greiner Unable to Attend—Carnegie Awards Made

Office of *The Iron Trade Review*,
Prince's Chambers, Corporation St.,
Birmingham, Eng., May 15.

The annual meeting of the Iron and Steel Institute was held May 13 and 14 in London, in the palatial home of the Institute of Civil Engineers. The meeting took place under dismal conditions; a drenching downpour of rain making the streets wretched. For the first time in its history, the serene atmosphere of science was disturbed by international animosities. The war of course affected the attendance, especially causing the absence of the president, Adolphe Greiner, who was unable to leave Belgium. The ruthless destruction by the Germans, of the Lusitania, had stirred national feeling to an extent never before experienced in the war, and the newspapers were full of stories on anti-German riots in London, Liverpool and elsewhere. The same feeling, though in a more intelligent form, was made manifest in the meeting in a demand, which very early found expression, for the expulsion from membership of Germans and Austrians.

The attendance was fairly representative, and included Arthur Cooper, L. L. D., the past president, in the chair, and Dr. J. E. Stead, Lord Airedale, Sir John Randle, Sir Robert Hadfield, Sir William Beardmore, Prof. H. le Chatelier (Paris), and A. Lamberton, Windsor Richards, Professor Turner, G. Ainsworth, Illtyd Williams, W. H. Hewlett, H. H. Ellis, B. Talbot, Walter Dixon, A. McWilliam and G. C. Lloyd, secretary.

Mr. Cooper, the chairman, in opening the proceedings, expressed the regret of the council at the inability of the president to attend "for reasons which they would understand." They believed Mr. Greiner was in good health, and a paper from him would shortly be read in the form of an addendum to his address of last year. In the letter which accompanied the paper, Mr. Greiner assured them that his colleagues were constantly in his thoughts, and he desired that his most friendly greeting might be conveyed to the members, with its expression of his profound regret at his inability properly to perform the presidential duties with which he had been charged. The chairman added that they had recently found that an association of Belgian engineers had been formed in London, and an invitation had been extended to them to attend the meeting. They cordially welcomed any of the members who might be present.

The report of the council stated that since the beginning of the war in August, direct communication with Mr. Greiner, the president, had unfortunately been impossible; but from time to time news concerning him and his family had been received through various channels. During the siege of Liege and from that time onward, Mr. Greiner had remained at his post, continually encouraging with his unfailing

ADOLPHE GREINER,
President, Iron and Steel Institute

spirit the members of the staff of the Cockerill company and his workmen, and organizing means for the alleviation of the distress of the large industrial population dependent on the company for employment. Notwithstanding the many anxieties through which he had passed, the latest news indicated that his activities were undiminished and that he and his family were in good health. Mr. Cooper, the immediate past president, had added to his many services by kindly performing the duties of the presidency. The total membership was 2,086, of whom 632 were foreign members. Of these at the outbreak of the war 101 were of German, Austrian or Hungarian nationality. Since August there had been two deaths and 19 resignations of German members, leaving 80 names still on the register. The report included the names of 84 members on active service in the armies of the allied nations, and it was proposed to enroll them in a special list for preservation in the records. The list of Belgian, French and Russian members was, however, incomplete.

Removed From Membership

The Council presented the following resolution for adoption:

"That the names of all alien enemies be struck off the list of members of the Institute, and that steps be taken to amend the by-laws so that they provide for the future that, in the event of war existing between this and other countries, citizens or subjects of which are honorary members or members of this Institute, such honorary members or members shall *ipso facto* cease their membership."

Muir Ritchie said he had no opportunity of discussing that matter with more than two or three members, but for himself the proposed course would meet the case for the moment. Personally he had no prejudice whatever against Austrian or other non-German enemies, especially against Hungarians, between whom and Great Britatin there were many old and strong ties of friendship. He hoped and believed that the time would come when those members would again be welcome there. But Germans were in an entirely different category. They had put themselves completely outside the pale of civilization. (Applause.) They had descended to depths of savagery such as no human being would have thought possible a few months ago. It would be quite impossible to find language to describe the behavior of the Germans during the war. The time had therefore come to take definite action and the council should consider the amending of the by-laws with a view to the future position of the Germans. They did not want to take up any hostility to many of those who were technically their enemies, those who were in Alsace and Lorraine and Schlesweig-Holstein. Probably after the war the German empire would not be what it had been, and they ought to be able to differentiate beteween those who were enemies today and might be friends tomorrow, and those other enemies who had proved themselves lying and treacherous foes, with whom he could not imagine there could be any

sort of possible association in the future. (Applause.)

Mr. Ritchie seconded the resolution, which was adopted, with enthusiasm.

The chairman presented the Bessemer gold medal for 1915 which had been awarded to Pierre Martin (formerly of Sireuil near Paris). He explained the admirable work done by Mr. Martin as far back as the sixties in the development of the regenerative furnace and its application to the melting of steel by the Siemens-Martin process. Other inventors had come so near success, that Mr. Martin's patent was immediately attacked in numerous costly law-suits; unfortunately he could not afford to fight these, and so he had to abandon the struggle. At the same time, it had never been denied that the honor of finding the practical solution of the problem of melting steel in the open hearth furnace belonged to him alone. For some years the bessemer process took the lead but for some time the open hearth had asserted its supremacy. Owing to ill health, Mr. Martin was unable to be present and Capt. Martin Zedi, a nephew, received the medal for his uncle.

The chairman announced the Andrew Carnegie awards. The gold medal was presented to E. Nusbaumer, Loncin-lez-Liege, Belgium, for his researches on "rotary bend tests." Several minor Andrew Carnegie scholarship awards were made including one to Eugene Louis Dupuy of Versailles for his researches on the influence of impurities in steel on the magnetic susceptibility. A grant of £100 was made to Thomas Gordon Thompson, of Seattle, Wash., to enable him to carry out researches on the protection of iron and steel from corrosion.

A telegram was received from the Comite des Forges de France "desirous to unite in expressing their sincere good wishes to President Greiner; they also expressed their cordial thanks for the honor done to Pierre Martin, and they herewith transmit to their allies the British Ironmasters the expression of their complete confidence in the coming victory." (Applause).

The secretary read the paper by Mr. Greiner entitled "Communication on the Heating of an Open Hearth Furnace by Means of Tar."

The chairman remarked that they valued it very highly, specially having regard to the conditions under which it had been written and on his proposition a resolution was heartily carried expressing thanks to the president and, their strong appreciation of his great services to the Institute, with their best wishes for his continued good health in his activities connected with his present sphere of work. The whole audience rose and carried the resolution with great enthusiasm. The following members were re-elected by the council: Prof. Henry Le Chatelier, Sir John S. Randles, W. R. Lysaght, C. K. Bagley and J. H. Darby.

Joint Convention

Philadelphia, May 25.—The National Supply and Machinery Dealers' Association and the American Supply and Machinery Manufacturers' Association will hold a joint convention at the Hotel Bellevue-Stratford, here, June 3 and 4. Among the speakers will be C. M. Ripley, of Richard D. Kimball Co., New York; Dr. Robert Grimshaw, of the New York University School of Commerce, Accounts and Finance, New York, and the Hon. Edwin F. Sweet, assistant secretary of commerce, Washington. The business program will be supplemented by numerous entertainment features.

Gold Medalist Dies

Pierre Martin, one of the inventors of the Siemens-Martin process of steel-making, commonly known as the open hearth method, died at Paris on May 23, according to a dispatch from that city. He was a member of the firm of Martin Bros. of Sireuil, France. This firm in 1864 adopted the siemens regenerative gas furnace for steel-making and elaborated the process by adding scrap without iron ore to the molten pig iron. The Martin process is called the "scrap and ore" process. The original siemens method was to melt pig iron alone and to oxidize the impurities with ore, and is known as the "pig and ore" method. The modification of this method by the Brothers Martin in adding scrap without ore was, in fact, a dilution process. The great part of the steel of the world now is made by the latter method, which has come to be generally known as the open hearth process. In Europe, the process still generally retains the name of the siemens-martin or martin-siemens process. M. Martin was honored with the award of the bessemer gold medal by the Iron and Steel Institute on May 13.

Thompson Land is Sold

Receivers of Josiah V. Thompson, Uniontown, Pa., have sold 76 acres of coal under the Thompson farm, three miles from that city, for $152,000 to the W. J. Rainey Co. The deal, it is said, was closed on a cash basis.

Ryerson Addition

St. Louis, May 25.—Joseph T. Ryerson & Son have completed the erection of a large fireproof addition to their plant here. The building is 300 feet long, 85 feet wide and 65 feet high, built of structural steel frame with metal skylights. It is equipped with a 10-ton capacity traveling crane, with a span of 85 feet. The building is to be used for storage of structural steel plates, angle bars, beams, etc.

Ryerson & Son bought the Hagar Iron Co. plant at Second and Monroe streets, and moved an efficient organization from their main office in Chicago to St. Louis. The designers of the addition to the plant were Ritter & Mott, of Chicago, and the contractors were James Stewart & Co., Inc.

Factional Trouble

A number of men at the Martins Ferry, O., plant of the Whitaker-Glessner Co., Wheeling, W. Va., quit work last week as a result, it is understood, of factional trouble in the ranks of the employes. Trouble is said to have been started by members of the United Iron and Steel Workers' Association, which was formed by seceders from the Amalgamated Association. The plant will not operate until troubles have been settled. Officers of the Amalgamated Association are endeavoring to settle the dispute.

Will Make Charcoal Iron

Birmingham, Ala., May 24.—The Shelby Iron Co. will blow in a furnace about June 1 at Shelby, Ala., to manufacture charcoal iron. The capacity of the furnace will be about 85 tons per day. This product maintains a price averaging about $21 per ton, and it is believed a good demand will be found for the output.

Paying Creditors

M. C. Fownes, Pittsburgh, who is effecting a reorganization of the Alton Steel Co., Alton, Ill., is paying creditors of that interest 40 cents on the dollar and 2½ per cent to stockholders. While plans are being considered for a reorganization of the Alton company, details will not be announced for two weeks or more.

W. H. Marshall, president of the American Locomotive Co., has been elected as second vice president of the Merchants' Association of New York.

Hands Off

Said Col. Pope, of Almost All Business, for it is Honorable

New York, May 25.—The National Association of Manufacturers opened its twentieth annual meeting at the Waldorf-Astoria hotel here today with a generous attendance. In the opening address, Col. Geo. Pope, president of the association, commented on the present business situation, with special reference to the effects of the war. Colonel Pope expressed his personal admiration for the impressive conduct of President Wilson in connection with the war and said the President justly merited the approval of all thoughtful citizens for his behavior in connection with problems of a delicate character.

"The significance of the present situation," said Colonel Pope, "should be neither underestimated nor overestimated. We shall be called upon to sell and deliver our products upon a scale heretofore unmeasured, and we must be alert to meet this extraordinary emergency and in a position not only to manufacture but to deliver properly the commodities demanded of us. Our products will be critically examined and rigidly compared with those of other nations. We must realize, therefore, that our opportunity is coupled with great responsibility."

Colonel Pope reported the appointment recently of seven members of the association to form a committee which during the coming year will carefully weigh the evidence for and against the proposal of minimum wage, insurance against sickness and old age, the problem of unemployment and other allied problems. In commenting on the work of the federal commission on industrial relations, Colonel Pope expressed a doubt as to whether many of the recommendations of this committee will merit serious attention. Plainly, he said, the conduct of this committee has been a failure. In regard to the federal trade commission recently created, he believed the most important function of this body should be the observation of a zealous care in applying its corrective efforts to irregular or corrupt business, and that it should leave undisturbed fully 99 per cent of business which is conducted on a legitimate and honorable basis.

The association not only adopted a resolution deploring the death recently of David McLean Parry, former president of the association, but held impressive service in memory of Mr. Parry. This memorial service was conducted by Dr. S. Edw. Young, D.D., Brooklyn, and was featured by the singing of several appropriate hymns.

Other speakers at today's session were Walter Drew, of the National Erectors' Association, who spoke on the work of the federal commission on industrial relations, and F. D. Schwedtman, whose topic was "Industrial Betterment". The session also was featured by a discussion on export trade. The speakers tomorrow include Jas. A. Emery, M. W. Alexander and Dr. Eugene L. Fisk. At the banquet tomorrow night, ex-President Taft and Senator Warren J. Harding, of Ohio, will be the speakers.

Will Not Pay Judgment

The United Hatters of North America, at their convention in New York City, last week, decided not to raise a fund to satisfy the $252,000 judgment to D. E. Loewe, of D. E. Loewe & Co., against the Danbury, Conn., local of the union, for damages incurred from a labor boycott. The national organization, however, voted to raise a fund for the relief of the individual members of the local whose homes and bank accounts have been attached in satisfaction of the judgment. The American Federation of Labor and other labor organizations were appealed to to render aid in raising this fund.

Personals

Nicholas Olono, a prominent manufacturer of Popayan, Columbia, South America, inspected several steel mills at Pittsburgh last week.

Dr. J. H. James, professor of chemical engineering, the Carnegie Institute of Technology, talked about the "Effect of the War on American Industries," before the Engineers' Society of Western Pennsylvania last week at Pittsburgh. Dr. James discussed the influence of the war on chemicals.

Harold F. Brooks has been made general manager of the Eagle Anvil, Vise & Rail Joint Works, at Trenton, N. J., to succeed Franklin Hendrickson. The latter recently resigned after serving in that capacity for many years and has taken his first vacation by traveling through California and other western states.

F. C. Smith, for the past 10 years affiliated with the Norwood Engineering Co., has purchased the Canner Machine Co., Saugerties, N. Y., and will operate the plant under the firm name of the Saugerties Foundry & Machine Co. Prior to his affiliation with the Norwood Engineering Co. Mr. Smith was connected with the Holyoke Machine Co.

Two Convicted---One Acquitted

Pittsburgh, May 26. (By wire.)—Dennis K. Bullens and David K. Simpson were found guilty yesterday in the United States district court of conspiracy in connection with the manufacture of steel for the Panama canal work by the Carbon Steel Co. Samuel M. Wetmore, former superintendent, also on trial for the same charge, was acquitted. Attorneys for the convicted men have asked for a new trial.

Obituaries

Joseph G. Beale, 77 years old, a prominent gas well operator, and well known in the steel trade in western Pennsylvania, died last week at Pittsburgh.

Charles F. Albrecht, 56 years old, former superintendent of the Painter mills of the Carnegie Steel Co., Pittsburgh, died at his home in that city last week. He had been connected with the Painter plant for 35 years.

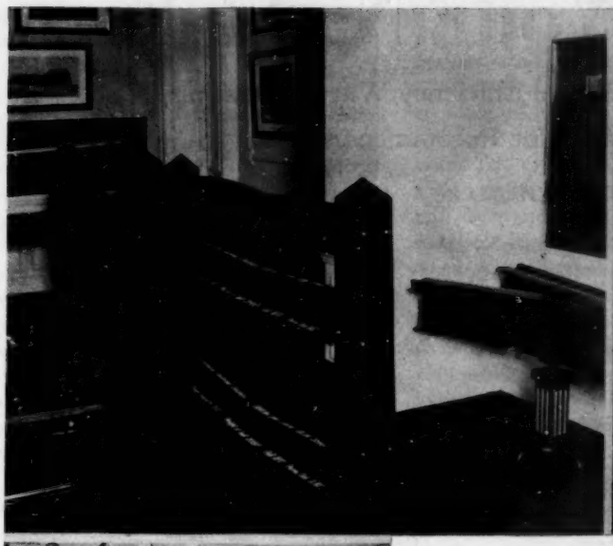
Samuel Hunter Milliken, president of the Pioneer Iron Works, Brooklyn, died at his home there on May 20, aged 73 years. He had been connected with the Pioneer works for 45 years and had been its president for the past 15 years. He was a veteran of the Civil War.

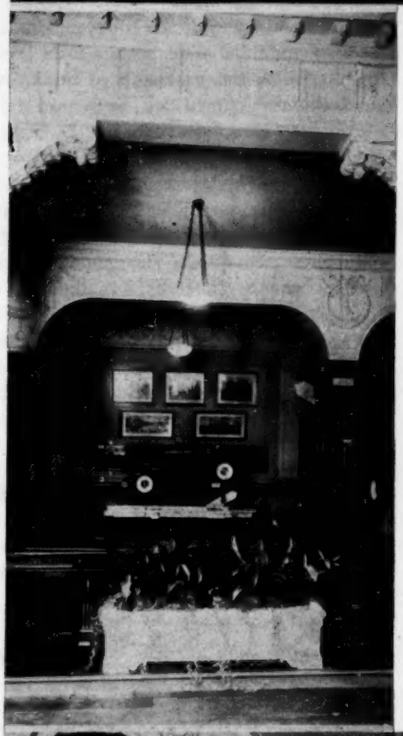
Henry Wickham, aged 70, died recently at his home in Philadelphia. Mr. Wickham was a former resident of Connellsville, Pa., a builder of the Trotter plant, of the H. C. Frick Coke Co., and one of the first coke plant managers of the Connellsville region. In 1884, the Trotter plant was obtained by the Frick company, and Mr. Wickham retired, going to Philadelphia.

The monthly meeting and smoker of the Association of Iron and Steel Electrical Engineers will be held at the German club, Pittsburgh, June 5. The convention of the association will be held at Hotel Statler, Detroit, Sept. 8-9-10-11. A. H. Swartz, Cleveland, representative of the Westinghouse Electric & Mfg. Co., is chairman of the convention committee.

The new warehouse of the Cincinnati Iron & Steel Co., Cincinnati, has been completed. The company found it necessary to enlarge its capacities in order to take care of the large orders for lathes received from Europe and domestic sources.

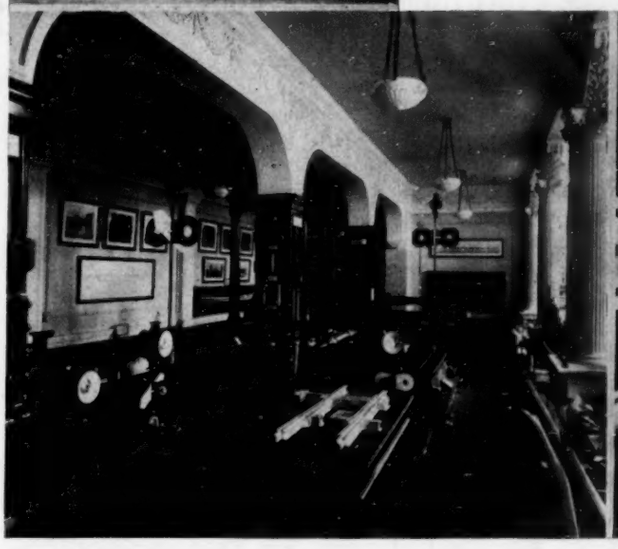
A new baseball park at Farrell, Pa., has been named Pargny Park in honor of E. W. Pargny, president of the American Sheet & Tin Plate Co.





Pennsylvania Steel San Francisco Exhibit

Among the interesting exhibits at the Panama-Pacific exposition is that of the Pennsylvania and Maryland Steel companies. The display covers 1,400 square feet of floor space in the Palace of Transportation. In addition to an attractive array of exhibits, comfortable meeting and lounging facilities have been provided. By means of a carefully arranged chart, accompanied by specimens, the process of manufacturing chrome-nickel steel from Mayari ores mined in Cuba is outlined. As a popular demonstration of the physical properties of this steel a heat treated frog bolt which has been turned to a diameter of ⅛-inch is shown, Fig. 4, sustaining a load of 2,345 pounds. Fig. 1 shows an exhibit of twisted Mayari open hearth steel rails and rail joints after drop tests. Figs. 2, 3, 5 and 6 show a portion of the display of track work and other iron and steel products.



How to Organize Your Night Force

Definite Hints on Methods to Adopt to Secure Efficiency When Operating Double Turn—Night Assembling Not Recommended

BY HAROLD C. WHITE

WHEN extraordinary volume of product is desired, three principal and closely related limiting factors immediately present themselves for the consideration of the factory executive — first time, second labor, and third facilities. The first has a positively fixed daily limit of 24 hours, and can be, and is, utilized to this limit in some instances. The second factor, labor, is limited by market conditions, and by the ability of the user to supply material and facilities to keep it profitably employed, thus presenting a problem, in the handling of which more or less flexibility of action can be taken. The third factor, facilities, is limited only by the ability to provide them and to use them, and here again considerable flexibility of action can be taken advantage of in order to successfully meet new and unusual demands for product.

The degree in which each of these three items is a limiting factor in securing additional production and their relative importance to each other as restricting influences are subject to determination by analysis, and just in proportion as we are successful in carrying out such an analysis, and in balancing time, labor and facilities to produce a synchronized and harmonious result, can we expect to profit by the employment of more than usual of any one or all of them. There is no profit to be gained in working additional hours per day if we greatly lower or cripple the efficiency of the workers by so doing; and likewise there is no advantage in employing workers and facilities out of balance with each other.

Methods successfully pursued to show which of these things to hit hardest, in order to secure increased production, and do it in a way that keeps all three balanced and in harmony, will be brought out to some extent in what follows; but it will, of course, be understood that the solution of the problem varies as the labor market, factory conditions, types of work and of workers, and the available supply of facilities vary, and that the solution that will apply in one case will not necessarily apply in its entirety in another.

During the past nine months the labor supply has been generally plentiful, so that the simplest and probably the best thing to put the most stress upon, has been the employment of more hours per day and additional men working nights, keeping the facilities employed about the same as before.

If the present demand continues long this condition will change; good men will be able to obtain nearly as good day jobs as their present night jobs, and as a consequence, the simplification of methods and the amplification of facilities will become the most important items for consideration.

With the cause and the results of the present heavy demand in mind, considering among other results the immense field which has been opened up and educated to the use of American tools and appliances, the demand will be a permanent one and the amplification of American manufacturing facilities will necessarily follow. This need will take time to develop and time to supply, and in the meantime night forces must be employed.

Study Conditions Carefully

To secure the best results from the employment of a night force, the conditions surrounding it should receive primary attention, as the handicap of working, sleeping and eating at unusual hours, is enough without having to face any other. Power, light and heat supply, distribution and segregation should be studied, and in many instances, can profitably be modified to meet, and not to exceed, the needs of the night force.

In some plants where power is steam generated and electrically distributed, it is comparatively easy to make modifications, and it is sometimes found profitable to purchase electric power for night running, rather than to run the steam plant full capacity night and day.

It pays to part line shafts, used for several departments, when only a few of the departments are operating nights, putting in small motors instead of one large one. The running of a long line shaft to take care of a few machines is frequently seen and is surely an unnecessary waste.

Lighting, in particular, should be ample, as poor work and small quantity is sure to follow where insufficient light is provided, and in addition to this, sufficient heat and ventilation should be supplied to keep operators comfortable. Cleanliness of surroundings should receive especial attention. It must be kept in mind that where machines are running double the usual number of hours, there is double the amount of chips and dirt produced and to be cared for, and as dirt is only secondary to lack of light as a limiting influence on the quality and quantity of work produced, this is an important point.

Additions should be made to the stock handling and accounting crew, together with the provision of additional stock handling facilities, such as stock racks and bins, conveyor skids, trays, etc., in order that machined material will not be delayed in transit from machines to assemblers. The longer such material is in transit between these naturally separated departments, the greater chance there is for damage in handling, and incidental increased labor in assembling, adding an unnecessary expense as well as delay.

Selected subjects should be provided for night work, confining such work to those parts which cannot be produced days. If detail records of the time involved in each operation of each part are available, and also records of idle machine time during periods of usual production, the selection of the proper points whereon to apply pressure is comparatively simple.

With no such records at hand, estimates of the machine time involved must be made as closely as possible and night work started upon that basis; the revision of practice proceeding as the work is carried on and one item or a group of items shows a gain on others. A valuable aid in picking out the right subjects for pressure, is a graphic chart showing the number of jobs on hand to start in each department, or on the same type of machines, the vertical lines of such charts being used to indicate quantity and the horizontal ones, time.

Such charts, together with a daily statement of the total number of jobs held in each department beyond a certain number of hours, provide the factory executive with a very clear idea of the relative standing of each department, both as regards to load and progress, and effectively point out where pressure is required.

The posting of these charts where they can be seen and compared by

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A paper read at the thirteenth semi-annual convention of the National Machine Tool Builders Association, Atlantic City, N. J., May 20-21. The author, Harold C. White, is superintendent of assembling, Pierce-Arrow Motor Car Co., Buffalo, N. Y.

department heads, is an incentive to healthy competition between them, as no one likes to bring up at the end of the procession.

Another aid and easy method of securing prompt and balanced action after work has been properly scheduled, is to post at the clerk's desk in each department, on a suitable rack, envelopes containing factory orders and requisitions for material, for all work starting in that particular department; across the envelope in 3-inch figures is stamped the "starting date" and envelopes are hung on the rack according to these dates. The work not starting on schedule is thus prominently and continuously called to the attention of all who are interested.

To avoid the necessity of answering questions as to reasons for delay, colored signals indicating lack of material, lack of machines, lack of tools or lack of men, may be hung with the envelope by the foreman or clerk. To aid in giving the proper precedence to work, after it leaves the starting department, visual indication of the relative importance of action may be given, at all stages of progress, by means of variously colored instruction cards, which accompany the work; each color representing a particular lot or balance. Detail precedence can be given to parts of the same balance, and bearing the same color card as other parts, if the scheduling has been perfected to a sufficient degree.

Like Running a Railroad

Regarding these indications of what to do and when to do it, and also, the indicating, for the benefit of the factory executive, of what has been done, it is interesting to note that modern machine shop practice has closely followed railroad train control practice. In the early days of railroading, when traffic was light and trains ran slowly, instructions for running were given verbally. As traffic and speed increased, schedules were prepared, and written orders and manually controlled signals came into play. When extremely dense traffic, at speeds which were unbelievable in the early days, became common practice, scheduling became an engineering problem, and written, telegraphed and telephoned orders backed up with automatically operated visual indications were given to train operators.

Train movements in congested terminals are visually indicated back to the operator in the remote tower, as they occur, and while we have not yet brought the movement of work in process in a machine shop quite to this degree of refinement, it is approximated by means of variously colored cards, in compartments of a suitably prepared table, being moved from a "not started" to an "in process" and thence to an "in stock" compartment as the work progresses, thus giving at a glance fairly positive information as to the relative standing of parts needed for a balance.

Even with the employment of a night crew, jig, tool and fixture equipment is a very live subject when extra production is wanted. Ample and immediate supplies, of this very necessary equipment should be provided, and the design and production of such appliances can be followed up in the same manner as applies to machined parts. The source of supply for this auxiliary equipment has been materially improved during the past few years and it can now usually be procured, made to drawings, as quickly and cheaply as when made by the user. Patterns should receive the same, or even more attention at times of pressure, as tools, and metal patterns or metal faced wood patterns and core boxes are frequently necessary and economical additions to equipment, where wood patterns served well enough before.

One of the dangers incidental to night work to be guarded against, and a point, by the way, which will have a direct influence on new business after the present export rush diminishes, is the more rapid deterioration of machine tool equipment. It must be borne in mind that machines and tools are doing double duty, and that wear and consequent misalignment and misadjustment are taking place at least twice as rapidly as usual; furthermore, at least some of the operators are temporary employes and more or less careless. Therefore, milling machine tables, drill tables, bearings, etc., should be gone over frequently and checked and trued up if necessary, so that accurate work is always possible. This precaution will remove at least one of the causes for trouble and poor workmanship, customarily laid at the door of the night force.

Watch the Personal Element

The selection of executives and of the crew, for night work has vital importance in relation to the profits derived from such work. Cases have been observed where the organization, discipline, and records of a considerable sized night force were so lax, that a few additional machines added to the equipment, and the employment of a small portion of the best of the night men on the day shift, entirely did away with the necessity of running a night force and resulted in a marked saving; so it is essential, that if a night force is to be employed at all, the selection of the men composing it be most carefully made. Here, again, good records of past performance, and an intimate knowledge of the men composing the day force is of valuable assistance.

Good results have been attained by the selection for the principal night executive of one of the best men of the secondary line of day executives. If a steady, young, ambitious man with a good record behind him, and good possibilities before him can be secured, so much the better.

For the leading night operators and for night foreman, it is well to select some of the steadier and more reliable day men, preferably, those with homes to pay for, and who consequently are willing to make some sacrifices in order to obtain the extra compensation usually offered for night work.

Fifteen per cent more per piece or per hour, working 60 hours per week of five nights, has, in the main, been found satisfactory. During extremely hot weather it may be found desirable to shorten the hours somewhat, stopping work at midnight Fridays. Smoking allowed during the night run or preferably during a portion of the night, say, from ten to eleven and from one to three o'clock, serves to bridge over the most trying hours.

Another feature that helps toward keeping night workers satisfied is the serving of hot coffee, or a hot lunch at cost, at midnight; this affords a good reason for keeping the men in the plant throughout the night trick, and keeps them away from neighboring saloons,

Efficient Results at Night

Night work is the rule rather than the exception in the shops of a great many machine tool builders, automobile manufacturers and others who are staggering under a tremendous burden of war orders at the present time. On the producing end of the iron and steel industry, night work is continuous and unavoidable, and there are few shops of any character in the metal working field that are not occasionally called on to operate double turn to relieve an extraordinary pressure for production.

The subject of the accompanying article by Harold C. White, therefore, is of universal interest and the questions he raises are of particular moment at this time. Under the most favorable conditions night work is comparatively inefficient, debilitating and unsatisfactory, but Mr. White points out how to get the best results when night operations become unavoidable.

removing a chance of losing some for half the night.

The inspection crew should be composed of the same type of men as the leaders of the night force and final inspection is better left to the day inspection force.

Machines should be set up ready to run by the day workers, thus avoiding in a measure errors apt to creep in at this stage, and, where practical, long runs should be provided. When necessary to set up to start operations nights, drawings, tools, and any instructions practice has proven desirable, should be boxed and made ready for the night men.

For assembling operations it is questionable if night forces can profitably be employed, especially where the work is of a very refined and complicated nature, as the opportunities offered for the covering up of poor workmanship, which may not be discovered until the product has been in service for some time, are too numerous. Furthermore, it is usually found that with additional quantity of product, assembling operations can be subdivided and specialized to a degree that enables much more rapid progress on that portion of the work than is usual, with a consequently marked decrease in cost. While it is usually necessary to employ additional jigs, fixtures and small tools to accomplish this end, the increased investment is comparatively small, and such equipment pays for itself within a short time. It is also found profitable to specialize the care and upkeep of such appliances, at times of pressure, to a greater degree than is ordinarily the case. Where one man usually cares for the grinding of drills, reamers and small tools used by a group of assemblers, two or more may be necessary.

In assembling work, again good records of past performances as regards time and the tools and appliances used are of great assistance in planning for increased volume, as such records allow the making of definite plans as soon as extra production is decided upon.

Touching on the degree to which assembling operations can be simplified and specialized, an example of such work as carried on at the Ford factory may be of interest. In the driving of six or eight screws in the rear axle, three men are employed; the first picks up and starts the screws, the second drives them home with a socket wrench mounted in an air motor, hung on a long spring, and the third goes over them with an open end wrench, this last operation serving as an inspection.

The work is continuous, passing from one man to the other, and the operators have their tools always in hand, and do not leave their tracks. Economy of labor and brain effort is reduced to a minimum and apparently more than offsets the high rate paid, as compared to customary practice. While not many manufacturers have the volume of repetition work prevailing in this instance, the principle employed can profitably be used in some degree, wherever increased production takes place.

Some of the incidental profits to be gained from the employment of a night force, are the permanent simplification and improvement of design, appliances and methods which are sure to accompany and follow pressure work, as good suggestions are bound to come out at such times, and everyone is more open to receive and act upon them than usual. Executive talent, previously more or less overshadowed is developed and proven. These gains are a permanent source of revenue.

Space and labor requirements, for a specified production, receive a direct and strong illumination and old hidebound restricting ideas as to possibilities are everlastingly smashed, thus permanently establishing and fixing a higher degree of efficiency.

As a summing up of the subject of "How to organize a night force properly" it may be stated, that the same principles and practices that can profitably be employed, in organizing a day force, can be successfully employed, with such modifications, added safeguards and refinements as the physical conditions make obvious and warrant.

The Recovery of Molybdic Acid

BY W. D. BROWN

ON ACCOUNT of the tremendous rise in price of molybdic acid, an attempt has been made in the Duquesne laboratory of the Carnegie Steel Co. to recover it from the filtrates from determinations of phosphorus. Various methods were tried before the present one was settled upon as giving the best recovery with the least work and expense. The method consists of the precipitation of the molybdic acid from the ferric nitrate solution with an excess of phosphate. At first the theoretical amount of phosphorus was added to the cold solution and but one-third the molybdic acid was recovered. At the present time five times the theoretical amounts of phosphate are added to the boiling solution.

It has been the practice to make acid in half-pound lots of 85 per cent molybdic acid, making 3,500 cubic centimeters of solution in agreement with the adopted methods of the United States Steel Corporation. The filtrates from 3,500 cubic centimeters of ammonium molybdic solution are heated to boiling and a solution containing 200 grams commercial sodium phosphate added. The precipitate is allowed to settle and, after the solution is decanted, is transferred to a large mouth bottle. When sufficient yellow precipitate from several precipitations are obtained, the precipitate is washed by decantation and finally transferred to a dish in which the water is evaporated off and the precipitate dried in a sand bath.

According to the commonly accepted formula for the yellow precipitate, it contains 92 per cent MoO_3 and 210 grams would contain the same weight of acid as a half-pound of 85 per cent. Accordingly, for the precipitation of the molybdic acid solution, 210 grams of yellow precipitate are weighed and 800 cubic centimeters of water are added, followed by 600 cubic centimeters of ammonia. The solution is cooled and 35 grams of magnesium nitrate dissolved in 100 cubic centimeters of water are added to precipitate all the phosphorus. After the solution has stood for some time, it is filtered and the precipitate is washed with 100 cubic centimeters of water or dilute ammonia. The filtrate is added to 1,900 cubic centimeters of half and half nitric acid, the total volume being 3,500 cubic centimeters containing the usual amount of ammonia and nitric acid.

The recover has been only about 85 to 87 per cent. The cost of the recovery of one pound of molybdic acid is about 10 cents, seven cents for the sodium phosphate and three cents for the magnesium nitrate, the ammonia being required in the ammonium molybdate solution.

A paper read at a recent meeting of the Pittsburgh section of the American Chemical Society. The author, W. D. Brown, is chief chemist, Carnegie Steel Co., Duquesne, Pa.

The Richardson-Phenix Co., Milwaukee, has purchased the patents and manufacturing rights of the Osborne valve. The company announces that it decided to manufacture this valve owing to the fact that a protector is used to prevent wiredrawing and cutting of the valve disc and seat place.

The War's Effect on Iron Industry

A Discussion of the Relative Importance of the Warring Nations as Producers of Iron Ore, Pig Iron and Coal

BY JOHN BIRKINBINE

THE European war, while drawing heavily upon the resources of contending nations, also seriously influences conditions in countries not engaged in hostilities, threatening lasting effect and possible future changes in many phases of development. For this reason a discussion is offered of the relative positions of the leading countries which produce pig iron or supply the requisite raw materials for its manufacture. To indicate past as well as present conditions, a period of at least four decades has been chosen as covering practically the era of greatest industrial growth.

Opportunities Offered

Prognostications as to future conditions are not attempted, but analyses of the data presented may suggest possibilities for nations now prominent or others wherein the development or utilization of these commodities is less pronounced, while similar studies of other industrial specialties may indicate even greater changes.

The accompanying article on "The War's Effect on Iron Industry," by John Birkinbine, has a particular interest at this time, as it is the last contribution by this noted engineer upon the subject with which he was most familiar. Mr. Birkinbine's death occurred May 14 at his home in Cynwyd, Pa., and brought to a close the life of one who was generally ranked as the leading iron ore authority of the country. This article was published in the April, 1915, issue of The Journal of the Franklin Institute and discusses the effect of the European war upon the iron industry of the world.

Iron ore and coal hold leading rank among mineral resources whose development has been and is coincident with the world's progress, for countries possessing these abundantly, or utilizing them liberally, are the dominant nations.

The United States produces more coal, more iron ore, and more pig iron than any other nation. Her strongest competitors are the European countries now at war, for each is an important factor in the supply of some or all of these commodities, and, together with the United States, are depended upon for 85 per cent of the iron ore, 96 per cent of the pig iron and 89 per cent of the coal supply of the world. They are also the most active producers of varied forms of iron and steel manufactures.

Effect is Far-Reaching

A disturbance as momentous as that produced by the European conflict is far-reaching in its effect upon industrial progress, and its influence may be expected to continue long after

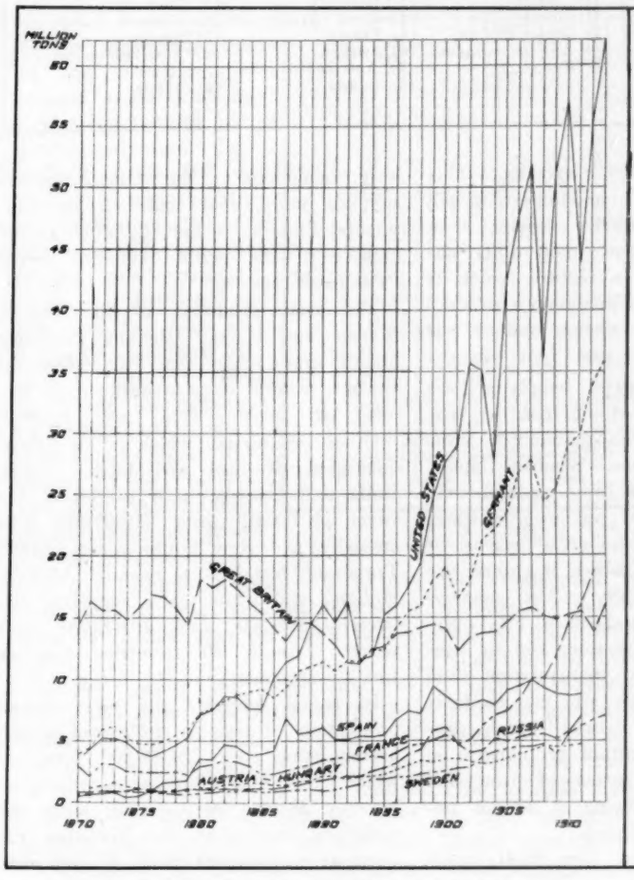

FIG. 1—PRODUCTION OF IRON ORE, 1870-1913

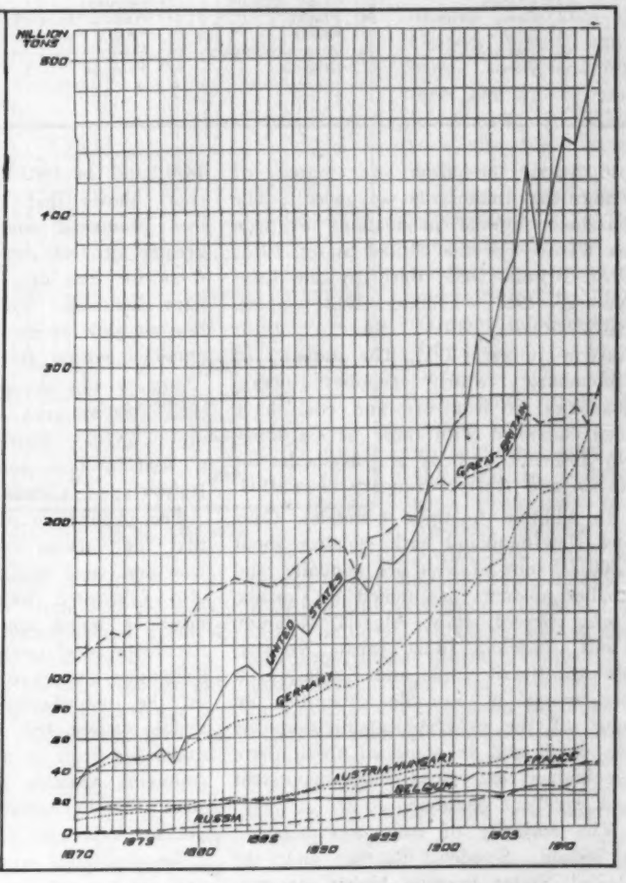

FIG. 2—PRODUCTION OF COAL, 1870-1913

peace is declared; for animosities do not cease with the suspension of active hostilities.

Consideration of iron as a factor in the world's progress necessarily is dependent on statistics, but, to relieve the discussion of voluminous tables, charts are presented on which are shown the conditions prevailing since 1870 in iron ore, coal and pig iron productions of important nations. The quantities recorded are in tons of 2,240 pounds, except for countries using the metric system, where the amounts are given in metric tons of 2,204 pounds.

In Fig. 1 is shown the annual production of iron ore in the countries which are prominent in supplying this mineral. Great Britain was the largest contributor of iron ore until 1889, when the United States took first place. Since 1895 Germany has exceeded the output of Great Britain. The output of the three nations was practically equal in the years 1893 and 1894, since which time the advance of Germany and the United States has been more pronounced than that of Great Britain. In late years the iron ore output of France has materially advanced. The maximum annual productions of iron ore were: For the United States, 1913; Great Britain, 1882; Germany and Luxemburg, 1913; France, 1912; Spain, 1907; Russia, 1911; Sweden, 1913; Austria-Hungary, 1911. The statistics of Luxemburg, which supplies liberal quantities of iron ore and coal, have been combined with those of Germany. No authentic records are available for Russia and Austria-Hungary since 1911.

In addition to these countries, Cuba and Newfoundland each supplies about 1,500,000 tons of iron ore annually, and smaller amounts are mined in Canada, China, Greece, Italy, Algeria, Belgium, Tunis, Australia, India, Japan, Norway, Mexico, Brazil, Chile and Korea. Iron ore exists in minable quantities in most of the geographical divisions of the earth and in some of these there are known reserves of enormous extent and excellent quality.

The majority of iron ores obtained in Spain, Sweden, Russia, and the United States average higher percentages of iron than those in Great Britain, Austria-Hungary, Germany and Luxemburg, France and Belgium. The relative weights of iron ore obtained in the different countries, therefore may not be considered as equitably comparative, for two tons of ore containing 60 per cent iron will produce as much metal as three tons of 40 per cent ore. The world's output of iron ore approximates 157,000,000 tons, the United States furnishing 36 per cent, and the nations now actively engaged in hostilities in Europe supplying an aggregate of 49 per cent of the total iron ore product of the world. This resource is a most important factor, and it has been asserted that the control of the iron ore deposits of what was then eastern France and Luxemburg, had a potential influence in the Franco-Prussian war of 1870, and is a factor in the present conflict.

The annual production of pig iron of the leading nations is shown in Fig. 3. England, which had long been preeminent in pig iron manufacture, was outstripped by the United States in 1890, and in 1903 by Germany. This chart shows that some important pig iron producing countries depend to a greater or less extent upon other nations for iron ore, a feature which is later discussed. The maximum production of each of the leading nations was obtained within the past four years.

Among the countries supplying less than 1,000,000 tons of pig iron per year are Canada, which contributes over a half million tons, Sweden, Spain, Italy, Japan, China, India and Mexico.

The production of pig iron indicates that the various commercial forms of iron and steel into which it enters, are also fabricated locally. The employment of liquid metal from blast furnaces for steel conversion, and of continuous processes of manipulation used in the manufacture of merchantable metal, causes the district which produces pig iron to attain prominence in supplying various forms of iron and steel, thereby advancing it as an important industrial factor.

To obtain pig iron, ores, fuels, fluxes and air are required; the last named is sufficiently abundant to cause no anxiety, and fluxes represent a minor part of the "charge." But the average ton of pig iron demands for its production the consumption of two tons of ore and a ton or more of satisfactory fuel. Hence the nation having its own supply of iron ore, and ample metallurgical fuel of desirable quality, has an advantage in the race for industrial supremacy. The total quantity of pig iron produced throughout the world is in the neighborhood of 73,000,000 tons. This is exclusive of metal obtained from forges by crude methods in a number of countries. Upon the above basis, the United States at present supplies 41 per cent, and the combined output of the European nations in conflict is 55 per cent of the world's pig iron product.

The production of coal by countries is shown in Fig. 2. England maintained pre-eminence in coal output until 1898, but since that date the United States has led, and in 1913 produced almost as much coal as its nearest competitors, Great Britain, Germany and Luxemburg, combined. The United States supplies more coal than all of continental Europe; in fact, as much as the balance of the world excluding Great Britain—39 per cent.

The coal produced in the United States and Great Britain averages higher grade than that of continental Europe, where large quantities of lignite or brown coal are secured.

Other countries which mine large quantities of coal are Japan, China, India and Canada, each producing between 10,000,000 and 20,000,000 tons annually, and New South Wales, Spain, Transvaal, Natal, New Zealand, Mexico, Holland and Chile, each supplying between 1,000,000 and 10,000,000 tons yearly. About 30 countries produce smaller amounts.

In round numbers the total annual production of coal in the world at the present time is 1,250,000,000 tons, of which the United States contributes between 38 and 39 per cent, while the combined output of the European nations at war approximates 50 per cent.

According to latest official data, the

Relative Rank of the Principal Nations

VOLUME OF PRODUCTS			PRODUCTION PER CAPITA		
Iron Ore	Pig Iron	Coal	Iron Ore	Pig Iron	Coal
(1) United States	(1) United States	(1) United States	(1) Sweden	(1) United States	(1) Great Britain
(2) Germany	(2) Germany	(2) Great Britain	(2) United States	(2) Belgium	(2) United States
(3) France	(3) Great Britain	(3) Germany	(3) Germany	(3) Germany	(3) Germany
(4) Great Britain	(4) France	(4) Austria-Hungary	(4) France	(4) Great Britain	(4) Belgium
(5) Spain	(5) Russia	(5) France	(5) Great Britain	(5) France	(5) France
(6) Sweden	(6) Austria-Hungary	(6) Russia	(6) Austria-Hungary	(6) Sweden	(6) Austria-Hungary
(7) Russia	(7) Belgium	(7) Belgium	(7) Russia	(7) Austria-Hungary	(7) Japan
				(8) Russia	(8) Russia

leading countries rank in volume of products as shown in the accompanying table.

The relative importance of the nations as producers of coal, iron ore, and pig iron is evident from the statistics presented, but the population of the countries in relation to the quantities produced is of interest. The per capita output is shown in the table.

Progress in iron ore and coal mining, and in the manufacture of pig iron, between the years 1870 and 1910, is as follows for the various countries, the quantities being quoted as per 1,000 inhabitants: In the interval of 40 years the population of the United States increased from 38,500,000 to 92,000,000; its coal output rose from 765 to 4,869 tons; its iron ores mined from 100 to 620 tons, and its pig iron made from 43 to 297 tons per 1,000 inhabitants, the rate of increase being most pronounced in the last 20 years. In the same period, Great Britain's population advanced from 32,000,000 to 45,000,000, and its coal output increased from 3,685 to 5,994 tons, but its iron ore production decreased from 513 to 342 tons, and in the decade ending 1901, to 292 tons. The amount of pig iron manufactured rose from 208 to 214 tons per 1,000 inhabitants, reaching 231 tons in 1881. In Germany and Luxemburg, the population was augmented from 41,000,000 in 1871 to 66,000,000 in 1910; its coal output advanced from 922 to 3,360 tons, its iron ore production from 106 to 434 tons, and the pig iron manufactured from 38 to 224 tons per 1,000 inhabitants.

In 40 years, the population of France advanced from 36,000,000 to 39,600,000, and contemporaneously its proportionate coal production grew from 438 to 991 tons, its iron ore output from 85 to 404 tons, and pig iron manufactured from 34 to 113 tons per 1,000 inhabitants. In Austria-Hungary the increase in population was from 36,000,000 in 1870 to 49,000,000 in 1910. In the same interval its coal output was augmented from 233 to 989 tons, its iron ore product from 32 to 92 tons, and the amount of pig iron manufactured from 13 to 41 tons per 1,000 inhabitants.

From 1870 to 1912, the population of Russia has risen from 85,000,000 to 171,000,000, and in that interval its coal mined advanced from 8 to 179 tons, its iron ore output from 9 to 41 tons, and its pig iron manufactured from 4 to 24 tons per 1,000 inhabitants.

Belgium produces but little iron ore, but while its population advanced from 5,000,000 in 1870 to 7,500,000 in 1910, its proportionate coal output rose from 2,692 to 3,222 tons, reaching 3,505 tons in the year 1900. This nation is a liberal manufacturer of pig iron, of which it produced 111 tons in 1870 and 249 tons in 1910 per 1,000 of population. Sweden differs from Belgium in having but a small coal supply but an abundance of iron ore. In the 40 years, the population advanced from 4,000,000 to 5,500,000, its iron ore output, much of which is exported, rose from 151 to 1,006 tons, and its pig iron production using charcoal as fuel, from 72 to 109 tons per 1,000 inhabitants.

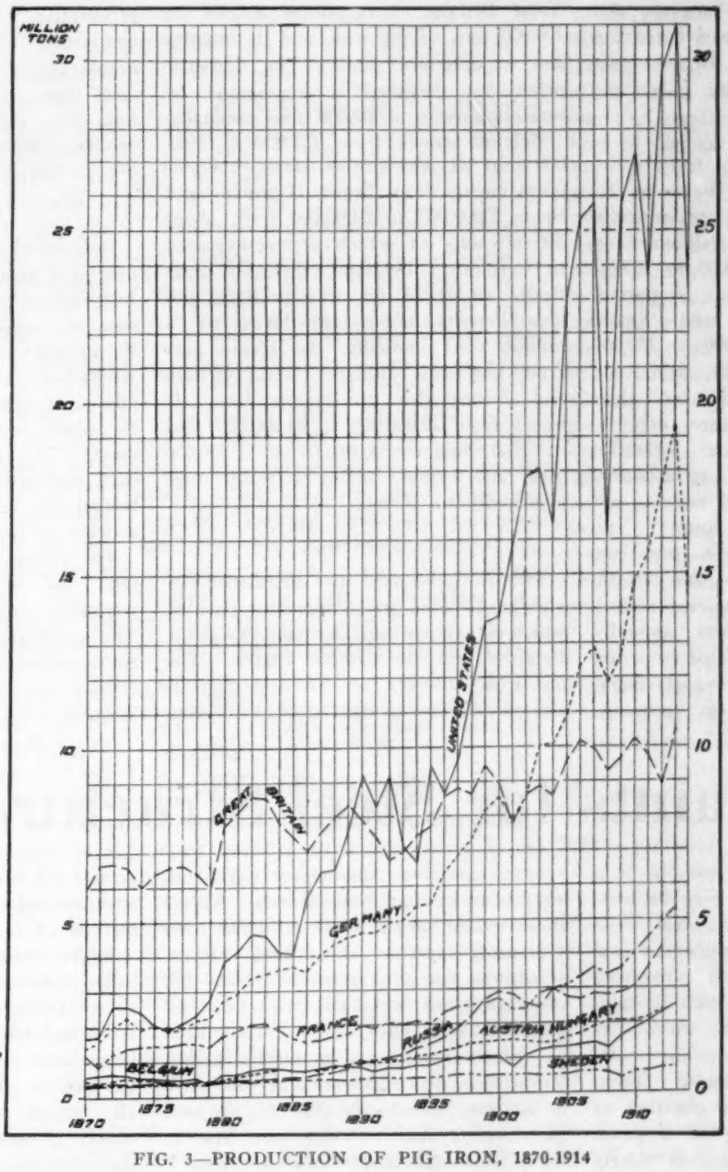

FIG. 3—PRODUCTION OF PIG IRON, 1870-1914

Reference has been made to the interdependence of nations, and, without attempting detailed explanation, this is epitomized in statements from latest data available of the amounts of iron ore, coal and pig iron exported and imported by various countries. In the United States all iron ore produced, except about 1,000,000 tons annually exported to Canada, is smelted in the country, and in addition, in late years, from 2,000,000 to 2,600,000 tons of iron ore are imported, principally from Cuba, Sweden and Newfoundland. The imports of pig iron and ferro alloys in late years into the United States range from 130,000 to 237,000 tons and the exports from 60,000 to 275,000 tons, showing that the domestic pig iron is used at home. From 12,000,000 to 22,000,000 tons of coal are annually exported from and 1,250,000 to 2,000,000 tons imported into the United States. Germany and Luxemburg smelt their domestic iron ores, and in addition import 11,000,000 to 14,000,000 tons, principally from Sweden, France and Spain, and have exported about 2,500,000 tons, chiefly to Belgium and to France. Germany annually imports 125,000 to 140,000 tons, and exports in the neighborhood of 1,000,000 tons of pig iron. German coal, in amounts varying from 31,000,000 to 34,500,000 tons, is exported to Austria-Hungary, Holland, Belgium, France, Sweden and Russia, and from 17,500,000 to 18,500,000 tons are imported into Germany.

Great Britain, in addition to its do-

mestic iron ore supply, draws 6,000,000 to nearly 8,000,000 tons from foreign mines, two-thirds coming from Spain, although Algeria, Norway, Sweden, Tuni., Greece and France contribute considerable quantities. No ore is exported. Great Britatin exports from 1,000,000 to 2,000,000 tons of pig iron, but the imports seldom exceed 250,000 tons. Of its large fuel production, 65,000,000 tons of coal and about 1,000,000 tons of coke are exported to continental European, South American and other countries. Those receiving more than 5,000,000 tons of British fuel annually are France, Italy, Germany, Sweden and Norway.

France

From France 4,000,000 to over 8,000,000 tons of iron ore are annually exported, principally to Belgium and Germany, and from 1,000,000 to 2,000,000 tons of iron ore are imported, mostly from Germany and Spain. France exports from 100,000 to 250,000 tons of pig iron annually, while its imports of this metal are less than half these amounts. France imports, mostly from England, about 16,000,000 tons of coal and 2,000,000 to 2,750,000 tons of coke, while its fuel exports are from 1,300,000 to 2,000,000 tons.

Russia exports little iron ore, but about 4,000,000 tons of coal and 500,000 or more tons of coke are imported.

Austria - Hungary imports annually from 500,000 to 600,000 tons of iron ore, mainly from Sweden, and exports about 100,000 tons, principally to Germany. From 100,000 to 200,000 tons of pig iron are imported and 28,000 to 60,000 tons exported. From 9,000,000 to 12,000,000 tons of coal are imported, principally from Germany, and 8,000,000 tons, mostly lignite, are exported, chiefly to Germany.

Spain and Belgium

Spain is a large iron ore producer, and exports 7,000,000 to 9,000,000 tons per year, the greater portion going to Great Britain. It produces 300,000 to 400,000 tons of pig iron, and its imports and exports are small. The domestic production of coal is augmented by importations of 2,000,000 tons annually.

Belgium mines from 125,000 to 250,000 tons of iron ore annually, but imports mostly from France, Germany and Spain 5,000,000 to 6,000,000 tons, about 500,000 tons of which are re-exported to Germany. Belgium fabricates practically all of its pig iron product, and also imports about two-thirds of a million tons annually, the larger part from Germany, although Great Britain and France also furnish pig iron. It mines from 22,000,000 to 24,000,000 tons of coal, imports 6,000,000 to 7,500,000 tons, and exports about 5,000,000 tons, principally to France.

Sweden

Sweden produces an abundance of high-grade iron ore, the greater part of which is exported to Germany, England, Belgium and the United States. The pig iron industry of Sweden depends almost entirely on charcoal, about one-fourth of the production being exported. The various nations have been discussed independently of any colonies or dependencies, for, as previously stated, the pig iron made has not been followed through mills and factories. But the statements presented may indicate how intimate the association has been between nations now combating each other and seeking to cripple their adversaries in every possible manner. These may also suggest the present and prospective status of each country as a contributor to the supply of resources necessary for the world's advancement, and show how changes of boundary lines may enlarge or reduce the independent manufacturing possibilities of the nations now at war.

War's Effects

Reference has been made to the necessary interchange of raw or manufactured materials between the countries now at conflict, and it is possible that the result of the war may greatly strengthen some or seriously cripple others of the contestants, according to the peace terms which may be agreed upon. The commercial supremacy of each nation is, to a great extent, controlled by its ability to manufacture articles of iron and steel.

The effects of such changes may extend far beyond the limits of the countries contending with each other. The possession of natural reserves of some nations or colonies, even in the Orient, may be more than a mere incident in the European war.

Paints for Steel Structures

PAINTS for the protection of iron and steel structures may be simple liquids, as drying oils; dissolved solids, as asphalt paints and coal tar paints; combinations of pulverized or finely-divided solids, known as pigments, and of drying oils, known as vehicles; and lastly almost any combination of any of the above. Technically, there may be some question as to calling a simple drying oil a paint, but when used as a coating it is merely an extreme case. Varnishes, which are mixtures of gums and oils, compounded by means of heat, are frequently introduced into the vehicles of paints.

The most important and extensively used paints are those which are mechanical mixtures of pigments and vehicles. The most important and common vehicle is linseed oil. Other vehicles are fish oils, china wood oil, soya bean oil and mineral oils. All of these except china wood oil have been frequently used as cheap and inferior substitutes for adulterants of linseed oil, although china wood oil, soya bean oil and menhaden (fish) oil are recognized as valuable assistants in certain paints. Turpentine and light mineral oils, such as benzine, benzol, naphtha, etc., are used as thinners and solvents and are so used both legitimately and otherwise.

An oil paint generally requires, in addition to the pigment and the oil, a small proportion of dryer, which is generally a liquid which, when incorporated into the paint, causes the film of it to dry by oxidation with the desired rapidity. Films of other paints, such as asphaltum and coal tar paints dry by the evaporation of the solvent.

It is quite generally considered that the most durable paints are those which are composed of pigments with linseed oil as the principal ingredient of the vehicle. Linseed oil varies in its composition and properties according to its method of extraction from the flaxseed, and its later manipulation. There is little or no choice nowadays to the consumer as regards method of extraction from the seed, this being controlled by large commercial concerns whose methods are practically identical in that they all employ the *hot-pressed* method which possibly gives inferior oil to that obtained by the *cold-pressed* method. Cold-pressed oil is obtainable commercially at a large advance in price, 10 cents per gallon at time of writing, over raw oil. After pressing, however, the oil is processed and refined by many methods and graded commercially accordingly. Raw oil and *boiled* oil are the two general kinds employed for structural metal paints and both of these are variously treated so as to considerably modify their properties.

Raw oil with drier added to it without heating has been sold as boiled oil

Portions of an appendix to the report of the committee on iron and steel structures presented at the Chicago meeting of the American Society for Testing Materials, March 16-18, 1915.

—"bung-hole" boiled or "chemically" boiled by those who understand the difference between this makeshift and true boiled oil which is heated to a relatively high temperature, and generally has driers added also. When heated in open kettles, which is generally considered the best method, it is called *open-kettle boiled* and there is supposed to be some virtue in having the heat applied by means of a wood fire under the kettle.

Many Methods of Treatment

There is room for much difference in treatment and skill in manipulation in boiling oil by the heating process and this leads to many claims of superiority by different paint manufacturers for their particular and secret methods in this line. Just how much if any real superiority there is in these special-processed oils over the commercial open-kettle boiled now readily obtainable of the large oil manufacturers, is difficult to prove or disprove. It is generally conceded that either raw or boiled linseed should be free from certain ordinary impurities in order to give the best results in paints. There is a great difference of opinion as to the merits of raw or boiled oil for paint-making purposes, but for metal paints the tendency seems to be towards the use of the open-kettle boiled oil.

As films of linseed oil-and-pigment paints are always more or less porous and pervious to water and moisture, considerable experimentation has been undertaken towards increasing the impermeability of the film by adding varnishes, bitumens and other kinds of oils to the linseed oil in certain minor proportions. If the proportions of these added materials become too great, the durability of the film is generally decreased on account of brittleness or otherwise.

The importance of the quality and proportions of driers is recognized, but these have apparently not as yet been the subject of any such extensive study as have oils and pigments.

The most extensive scientific study of the properties of paint materials probably has been made on pigments. For a long time paints have been principally known to engineers and others simply by the name of the pigment element, as iron oxide paint, red lead paint, graphite paint, etc., and it was long supposed that the pigment was the principal factor in determining the efficiency of these paints.

Pigments are commonly divided into two general classes, which may be called *primary* and *secondary*. Those in the primary class are the ones strong in color or in covering power and sometimes forming chemical combinations with the vehicles. Those of the secondary class are weak in color and covering, generally not suitable for use alone as pigments, but suitable as fillers and extenders when mixed with these primary pigments; these are commonly known as "inert" pigments, although this is really a bad designation, since many of the primary pigments are chemically inert to all atmospheric influences and to the usual paint vehicles.

The principal primary pigments used for structural metal paints are the following:

1.—White leads.
   (a) The basic carbonate, which is the kind made by the well-known Dutch process, and (b) the basic sulphate, commonly known as the "sublimed" variety.
2.—Zinc oxide or white zinc.
3.—Red lead.
4.—Blue lead.
5.—Iron oxides, including Venetian red.
6.—Lampblacks, generally the product of burned petroleum oils.
7.—Carbon blacks, generally the product of burned natural gas.
8.—Graphites, natural and artificial.
9.—Ochres.
10.—Natural carbons, slates, clays, etc., possessing peculiar properties fitting them for pigments.
11.—Chrome greens and yellows, used generally for tinting only.

The cost of the above pigments will usually range from 2 cents to 10 cents per pound, except the chrome pigments which, when pure, are much more expensive. Pigments which are sometimes used, but are generally prohibited on account of their high cost, are American vermillion and other chromates and Prussian blue.

The principal secondary pigments are:

1.—Silica.
2.—Asbestine.
3.—Barytes (natural sulphate of barium).
4.—Calcium carbonate, including chalks (frequently called whiting).
5.—Clays.
6.—Gypsum.
7.—Blanc fixe (artificial sulphate of barium).

These are all cheap materials, usually costing under 2 cents per pound. When used they are mixed with the primary pigments to cheapen the product and often with definite ideas of improvement of the paint. For instance, a small percentage of calcium carbonate is said to counteract any free acid that may be present in the primary pigment; silica is thought by some to give a "tooth" for holding subsequent coats; asbestine and china clay aid in keeping pigments in suspension in the vehicles; barytes gives weight and body to paint; blanc fixe, used in large proportions in proper mixtures, is said to give excellent results for certain sea air exposures.

As before mentioned it has for many years been generally thought that the pigment is the ingredient which has the greatest influence on the durability and efficiency of paint coatings, especially those for the protection of steel surfaces, although paint technologists recognize the great importance of the vehicle and that the two must largely be considered together. So many pigments have been available and in so many variations and combinations that it has not been easy to determine their relative merits nor the properties which are necessary for suitable pigments. The question of color often is the determining factor, especially when white and very light shades of color are wanted, for which the white leads and zincs must be used; but for dark colors almost any of the pigments can be used, tinting as required, even the white pigments. It may surprise some to know that a *black* pigment can be produced by mixing 45 parts by weight, of white lead and 55 parts of carbon black. Excepting the question of color, the present field of pigments may be said to be the survival of those found fittest by many years of trial. To further determine the relative merits of these pigments, many tests have been made by individuals, paint manufacturers, railroad companies, technical associations and others, with coatings made with these various pigments, applied both to test plates and to structures in service, exposed to various atmospheric influences and to artificial substitutes for them, and except for certain special conditions of application and exposure, without decisive results. Probably the most prominent of these tests are those of the American Society for Testing Materials and widely known as the Atlantic City and the Havre de Grace Bridge Tests.

The Robert Maclees Specialty House, Jersey City, N. J., manufacturer of sand-blast machines, goggles, helmets, etc., has purchased from the Cement Gun Co., Inc., New York City, the rights to manufacture in the United States and Canada, the Kelly high pressure sand-blast equipment. The machines of this type carried in stock by this company also have been secured, together with the necessary supplies and accessories. These machines will be manufactured at the company's factory at Pittsburgh and demonstrations after June 1 will be made at Orange, N. J. This machine originally was placed on the market by the High Pressure Sand Blast Co. and it subsequently was purchased by the Cement Gun Co., Inc.

Beaudry & Co., 141 Milk street, Boston, Mass., have issued a booklet showing how their forging hammers may be adapted to motor drive. A description of a new type of friction clutch which is used on Beaudry motor driven hammers is included.

The Hydraulic Press Mfg. Co., Mt. Gilead, O., has issued a folder devoted to its line of hydraulic pumps, valves and fittings.

Specification for D. C. Electr. Motors.

For ..... Dep't. Requisition No. ..... 190....

Number wanted	
Size	
Horse-Power	
Type	
Make	
Rev. pr. Min.	
Winding	
Dir. of Rot facing comm.	
Voltage	
Arma. shaft extension	
Arma. bearings	
Lubrication	
How appl. to work	
Driving	
Controller or Starter	
Brake and Make	
with or without Counter shaft	
Gear reduction	
Counter shaft on right or left side facing com.	
Counter shaft extensions	
with or without Slide rail or Pulley	
Depth of Com. bars	
Specification No.	
Drawing Nos.	

Fig. 2

RECORD OF PISTON CHANGES.
Left side-Front End-No.1 Gas Eng.

No. of Piston	Date Installed	Width of Ring	Make of Iron	Date Taken Out	Length of Service	Remarks

Fig. 1

DATE ..... 19 .....
LOCATION .....
SERVICE .....
MAKE ..... ; TYPE ..... ; SIZE ..... ; H. P. .....
No. ..... ; R. P. M. ..... ; VOLTS ..... ; AMPS. .....
METERS USED
SHUNT USED ..... AMPS; SPEED OF PAPER ..... PER MIN.
TEST:
LOAD { MAXIMUM ..... H. P.
FRICTION ..... " ; AVE. VOLTS .....
AVERAGE ..... ".
SIGNED ..... ; CHECKED .....

Fig. 3

RECORD OF MOTOR INSPECTION

LOCATION ..... DATE .....
MAKE ..... TYPE ..... H. P. .....

SWITCH
FUSE
BRUSHES
BRUSH HOLDERS
COMMUTATOR
FIELDS
BEARINGS
WIRING
CONTROLLER
GENERAL CONDITIONS OF MOTOR
REMARKS

Fig. 4

RECORD OF ARMATURE BREAKDOWN

Date ..... Service ..... Type ..
Location ..... Day motor inspec .....
Operator ..... Night motor inspec .....
Time required for change .....
Date of last change .....
Cause of Breakdown .....
.....
.....
What do you suggest to prevent similar breakdowns: .....
.....
.....
.....
Signature of motor inspect .....
OVER

Fig. 6

RECORD OF TYPE MOTOR
ARMATURE BREAKDOWNS.

Spare armatures .....

Date	Service	Location	Cause of Breakdown	Date Compltd

Fig. 5

ELECTRICAL REPAIR RECORD CARDS OF NATIONAL TUBE CO.

An Electrical Repair Record System

Description of Methods of National Tube Co. in Following Up the Performance of Motors, Generators and Other Electrical Apparatus

BY JOHN F. KELLY

THE continuity of steel mill operation today depends largely upon the successful performance of the electrical apparatus, and it is most essential that the equipment be prepared at all times to deliver the energy required of it. Therefore it becomes necessary to adopt and apply such methods and systems as will bring to the attention of the proper authorities in the shape of records, the excessive attention required, the high cost of repairs and maintenance and the loss of production which may be caused by inefficient or defective apparatus, in order that the necessary steps may be taken to apply the proper remedy. It is the intention of the author to describe briefly a system of repair records which has in a measure proved successful.

In the power plant, with its engines, generators, switchboards and miscellaneous equipment, a careful record is kept of inspections, repairs and renewals. The most important parts of the engines are each assigned a card, upon which is entered a record of all inspections, repairs and renewals which affect this particular part of the engine. For instance, the manner in which piston changes are handled is shown in Fig. 1. The most important parts of the generators, switchboards and miscellaneous equipment are handled in a similar manner and thus we have in writing a record of the principal parts of the different apparatus. Wherever practicable cards are used which can be filled in by men directly in charge of the work, and the card need only be referred to the proper executive and then filed, thus reducing clerical work to a minimum.

Complete Motor Records

We will describe as clearly as possible the cycle in which a motor moves from the time it is ordered from the manufacturer until it has been disposed of or becomes obsolete. Upon receipt of instructions to procure a motor, we fill in a form which contains specifications for each part of the apparatus, this together with a requisition is forwarded to the proper authorities for approval. This form is shown in Fig. 2.

When the motor is received from the manufacturer, the record, which is to be the permanent one, is started and consists of a wallet 1 inch thick, 5 inches deep and 7 inches wide, the face of which is marked as shown in Fig. 3. The wallet is then placed in a file, it is indexed under location and the record of every inspection, repair or renewal being filed in this wallet, during the whole time this motor is carried as plant equipment.

The motor while in service is systematically inspected, the result of the inspection being recorded on a form shown in Fig. 4. The record is passed to proper authorities for their analyses, orders are issued for the parts requiring repairs or renewals and the record of inspection is then filed in wallet.

When an armature proves defective, it is of course immediately replaced and sent to the sub-department where the card shown in Fig. 5 is filled in. The armature is forwarded to the winding department and the card to the office, where two separate and distinct records are maintained on defective motors. These records are shown in Figs. 6 and 7. One set of cards is indexed and filed according to type of motor. The other set is indexed under the name of the inspector in charge of the section in which armature failed, thus giving a record of the service of the different types of motors, also the number of breakdowns under each inspector. After the data has been entered, the armature breakdown card is sent to the general foreman for his remarks, then passed to the superintendent for his approval, after which card is filed in the wallet bearing the name plate reading of the motor in which armature failed. Field coils, Fig. 8, brushes, Fig. 9, and bearing repairs, Fig. 10, are followed up in a similar manner and all the records are finally filed in the wallet.

We also have a system by which we endeavor to keep electric cranes up to a high degree of efficiency. Each crane is assigned a card, Fig. 11. After each regular inspection the condition of the various parts of the crane are recorded under the part affected. The cards are written in duplicate.

The original card is sent to the superintendent who carefully scrutinizes the report as written in by the inspector, and points out with red pencil the items which are to be given immediate attention from a standpoint of safety. These cards appearing on the superintendent's desk regularly and automatically tell their own story whether the crane is rendering efficient service. It can readily be seen that the record of these inspections, posted under the parts affected on each crane's card, soon becomes a valuable reference, especially if the foreman has neglected to make the repairs and renewals reported on the card as being necessary on the previous inspection. The duplicate card is sent to the foreman who has charge of the crane. This record enables the foreman to promptly replace or repair any parts that have been reported as defective.

Where a delay seriously interferes with production, we have the craneman fill out the card shown in Fig. 12. At the end of the month a tabulated report is made showing the number of hours worked, number of hours delayed, causes of delay. Some cranes have averaged as high as 1 per cent and as low as 0.49 per cent of the number of hours worked.

Electric Repair Shop

Every electrical repair shop should have a system of ascertaining the cost of repairs and renewals, and the most important object to be obtained in such a system is simplicity. It should be easily understood, economical in operation and its importance to the whole organization must be recognized. Following is a description of the system we use in ascertaining the cost of repairs and renewals.

All orders received covering the repair or renewal of a part of the electrical or mechanical equipment are in duplicate, and stocks are checked for the material required to prevent free stock from accumulating, proper symbols for labor and material changes are inserted, then passed to proper authorities for in-

Presented before Association of Iron and Steel Electrical Engineers as a discussion of a paper on Repairing Electrical Apparatus, by G. E. Stoltz, published in *The Iron Trade Review*, May 13. The author, John F. Kelly, is assistant electrical engineer, National Tube Co., McKeesport, Pa.

RECORD OF MOTOR INSPECTOR

Department.....Name.....

No. of Motors on route.....

Date	Type	Service	Location.	Cause of Breakdown

Fig. 7.

RECORD OF *FIELD COIL* BREAKDOWN

Date ..... Service ..... Type .....

Location ..... Day motor inspec .....

Operator ..... Night motor inspec .....

Time required for change .....

Date of last change .....

Cause of Breakdown .....

What do you suggest to prevent similar breakdowns: .....

Signature of motor inspec: .....

Fig. 8

RECORD OF MOTOR BRUSHES

MAKE ..... TYPE ..... H. P. .....

LOCATION .....

DRIVING .....

NUMBER OF BRUSH HOLDERS ..... NO. BRUSHES .....

MAKE OF BRUSH HOLDERS ..... SIZE OF BRUSH .....

Fig. 9

RECORD OF BEARING CHANGES

DATE ..... SERVICE .....

METAL ..... LOCATION .....

DATE OF LAST CHANGE ..... BORE ..... LUB .....

CAUSE .....

REMARKS AND SUGGESTIONS .....

Fig. 10 FOREMAN .....

SAFETY ALWAYS _____ CRANE CARD

_____ TURN _____ 191_

NAME _____

CHECK NO. _____ CRANE NO. _____

Hours Worked	Cause of Delay.	Time Delayed

NOTE—USE YELLOW CARD FOR OVERTIME

Fig. 12

RECORD OF CRANE INSPECTION

LOCATION _____

DATE	OPERATOR	LOCK NO.	CAGE	BRIDGE	HOIST	LIMIT SWITCH

Fig. 11

WORK CARD

JOB NO. _____ B. P. NO. _____ CHARGE _____

DESCRIPTION _____

DATE	CHECK NO.	OPERATION AND PARTS	NO. PARTS	HOURS	MACH. NO.

Fig. 13

RECORD OF REPAIRS TO CONDUIT WIRING

Date ..... Service ..... Size of Pipe .....

Size of Wire ..... Nature of Burnout .....

Date Installed ..... Time Required for Repairs .....

Location ..... Insulation .....

Material Required for Repairs .....

Cause of Repairs .....

How to Avoid .....

Fig. 15 Signed .....

RECORD OF REPAIRS TO WEST. ELEC. & MFG. CO. CIRCUIT BREAKER.

Date ..... Service .....

Location .....

Time Required for Repairs ..... Delay .....

Nature of Repairs .....

Cause of Trouble .....

If Sent to Shop, Give Req. No. .....

How Avoided .....

Signed .....

Fig. 14

RECORD OF REPAIRS TO CUTLER HAMMER COMPANY DYNAMIC LOWERING DRUM TYPE CONTROLLER

Date ..... Service ..... Location .....

Date Installed ..... Delay ..... Time to Repair .....

Nature of Trouble .....

Material used for Repairs .....

Cause .....

How to Avoid .....

Fig. 16 Signed .....

ELECTRICAL REPAIR RECORD CARDS OF NATIONAL TUBE CO.

spection and approval, after which the order is sent to the engineering department to fill in all necessary engineering information. The order is then passed to a clerk who places on both copies the shop job order, retaining duplicate for the uncompleted order file, the original copy being for the shop foreman's file.

Labor is one of the most essential points in the cost of the manufacture of an article, often being far greater than the cost of the material, therefore, we adopted the time card, Fig. 13, which is written out in duplicate. All necessary information is placed on the time card, the number of pieces to be manufactured, pattern numbers of castings, symbols for labor and material charges and requested date of completion. The original card is pinned to the original copy of the order and forwarded to the shop foreman for execution. When the order is received by the shop foreman he immediately orders all necessary material, files his card in a tickler and allows himself enough time, after which the card automatically turns up. On the wall is a board with pockets which have numbers on them corresponding to the numbers of the shop machines. The cards are numbered to correspond to the machine numbers and deposited in the pockets to prevent confusion. When a workman has finished one job and is ready for another, he has but to go to the board and the card which is in the pocket corresponding to the number of the machine which he is operating is his next job. The blue prints being ready, he enters on the card his name, check number, operation, time started and when through with the job he enters the time completed and deposits the card in the foreman's office, who approves it and forwards it to the time clerk, where it is filed under job orders.

The plan described serves to show the amount of labor performed, and the flat cost of labor necessary for each job can thus be obtained. The data which we obtain from these records become valuable for reference and enables us to overcome many of the difficulties which affect the operation of the apparatus which is in use. Miscellaneous electrical equipment is handled in a similar manner to the systems outlined previously, and records are maintained on circuit breakers, Fig. 14, repairs to conduit wiring, Fig. 15, and repairs to dynamic lowering drum controllers, Fig. 16.

The system of recording data has proved of inestimable value and too much importance cannot be attached to the exact filling in and recording of all items that are to be covered by cards. Tracing back the statistics secured enables us to locate and remedy defects. Cards should be filed in such a manner as to be immediately accessible for the purpose for which they are designed. The methods and systems as outlined are inclusive in their scope, yet simple in their operation and are easily understood. They require little time on the part of employes for filling in the required data, are not expensive in operation and the results obtained repay the maintenance of the system and justify every effort in its behalf.

Discussion of Electrical Repair Methods

C. A. MENK (Homestead Works, Carnegie Steel Co., Pittsburgh):—During the past five or six years we have endeavored to arrive at the expense of electrical repairs. There was a time when we thought it was not worth while to go into the matter, but we have now devised a way to keep a correct account of certain repairs and we are able to find out just where the trouble is. I do not think you can find this out unless you keep a record of repairs. We do not put it up to the foreman or inspector, but in the case of armature repairs we leave it to the shop men. In putting through an order for repairs, the shop man must state where the piece of apparatus came from, i. e., the particular machine, so that the proper record can be made.

For this purpose we installed a card system. The card is tagged similar to a shipping tag; it tells us what the apparatus is, states the exact location and use, whether upon a crane, hoist, trolley or mill cable. This card is then tied onto the apparatus. The moment the apparatus goes into the shop we attach another card, which is placed in a linen envelope. On this card is placed certain information, such as, "date received," "nature of trouble," etc. We might state we occasionally ran into trouble when a man would bring in a certain piece of apparatus for repairs. In a number of cases we discovered something entirely different from what we at first thought to be the trouble, and, in this way, we perhaps avoided serious future trouble. On the reverse side of the card is a statement of material used and labor performed. We look these cards over monthly and make comparisons. If we find that a certain location is giving excessive trouble and cost, we investigate and see just what we can do to remedy this.

We often found the motor was overloaded about 100 per cent. By making changes at this particular point, we stopped these repairs, and by taking out the equipment and using it elsewhere we probably avoided delays in operation. In this way we overcame excessive charges on one department, charging it with the new apparatus and crediting it with the old.

Reducing Repair Bills

We have reduced our ordinary repair bills at least 60 per cent, and I believe by following out our present system, we will still further reduce this.

We are keeping a record of lost time on the mills, and it has gotten so there is nothing to keep—you do not hear of any delays. This might seem strange, but it is a fact; probably due to the fact that we have duplicate apparatus to a certain extent and have larger machines. Where necessary, we keep extra motors, so we can make quick changes, quick repairs and fix up the motors during the operation of the mill.

E. FRIEDLAENDER (Edgar Thomson Works, Carnegie Steel Co., Braddock, Pa.):—Years ago we all used to rebuild electrical apparatus nearly every Sunday. We did not think anything of taking out 10 or 20 armatures each week. We all worked double-turn and thought we were lucky if we kept the mill running all week. All this has changed and we are running motors for years at a time. The only reason we take out armatures now is because bearings are wearing out. I think this improvement is mostly due to the better class of motors which we are receiving from the electrical manufacturers, also to the better control, the high grade brushes, and to the fact that we understand the machinery better.

I think our method of inspecting machinery is often wrong; an inspection of machinery does not mean to wait until repairs are needed—we should inspect the machine and put it in good condition before it breaks down. For the purpose of inspection we have inspection sheets and are dividing our force into squads, assigning some particular mill to each squad. A foreman is placed over a number of these squads and he fills out printed inspection sheets each week. On this sheet are detailed all the important parts requiring inspection, such as commutators, field coils, brushes, etc.,

and upon this the foreman notes what repairs were last made and what repairs should be made. We get these reports Saturday morning and they tell us what we have to do after the mills shut down. These sheets are also used for traveling cranes.

We are only interested in the cost per ton of steel and we do not care to know the cost of every repair in the mill; only the repairs which are contributing factors to the cost per ton. Some of these details would be entirely useless unless they helped us to eliminate delays, which is by far the most important item. We may save $100 in repairs on a motor, but in doing it we may lose $1,000 through delays. A superintendent of a large blast-furnace demands that new coils always be used on skip hoist armatures—never repaired coils.

I think it is very difficult to make proper charges for repairs. In case of a breakdown, we take the armature out of a new motor and replace it with an armature which has been in service for many years. The department owning the old motor gets the new armature and the other department, in a short time, will have to pay for rewinding the old armature. How can you arrive at the proper depreciation cost of machines which have been used only temporarily?

All these records are not worth while and are only a waste of time and money.

We all know how complicated is the keeping of a store room for a large electrical plant. We cannot depend upon the manufacturer for spare parts: he sells us machinery and we might have to wait two weeks or longer for spare parts, this being especially true where the manufacturer is located three or four hundred miles away. The manufacturer is not as interested as we are in keeping every little spare part.

Do not forget that we are making steel—not selling motors. It is entirely different for the manufacturer of motors to keep records of what it costs to build the motors. Of course we should keep records to tell us how long chains, ropes, bearings, brushes, etc., have been in service. Such records are necessary, not so much for the matter of costs, but for the purpose of keeping the delays down and for safety purposes.

Some gentleman suggested having the crane operator inspect the crane. This is impracticable as the crane operators often prove to be foreigners who do not know the motor from the brake, and who will merely sit in the cab and operate the levers. If anything goes wrong, they can only shut down the machine.

PAUL CALDWELL (General Electric Co., Pittsburgh):—I have had a number of cases, tabulated as trouble, which could have been eliminated by a proper system of inspection. I have one particular example in mind of a large user of drum controllers. This is an example of the trouble a man can get into if he does not check up his difficulties. He had installed about 50 to 75 drum controllers and after several months operation, found himself in hot water and the thing was reported for investigation. Upon looking into the trouble, we found the man in question kept no records, had no inspector's reports made of cranes, neither of the motors nor controllers, and the result was that the repairs were being made haphazard. They were not made until the machine broke down, this being true of both the motors and controllers. Investigation showed that certain parts of the equipment were worn out and ready to be thrown off—some parts being worn through—and no one seemed to know that this condition existed until the complaint was brought up for investigation. Steps were immediately taken to remedy it.

Keep the Superintendent Out in the Plant

B. W. GILSON (Ohio Works, Carnegie Steel Co., Youngstown, O.):—At the Ohio works we keep a cost record. We tried the method of tagging apparatus Mr. Menk spoke about, but found it to be an absolute failure due to the cards getting fingered and dirty, and by the time they came back to the shop we did not know where they came from. We finally turned this work over to our shop foreman, who gets our crane records which are made out every 12-hour turn. He also checks up the inspector's report to see that it corresponds with the crane operator's report. Then, if there has been any apparatus changed during the turn, he follows it up, whether on the crane or throughout the mill. He has a horse and a cart which he sends out after the apparatus, and makes a record to keep track of the cost.

However, we found that we went a little too far in keeping records. We had seven men in the office, or almost as many office men as we had motor inspectors, so we finally decided to cut our office force down. Our costs then went down and our stationery dropped from $32 to about $3.50 for one item. I believe the cost of repairs went down proportionately. I believe you can hire clerks to take care of the records for possibly $50 or $60 per month, have the superintendent get out and see the work as it is progressing, and in this manner cut down the cost far more than if he sits in his office and goes over these records without knowing what these inspectors are doing or how the apparatus is working.

We find by keeping the cost of special jobs, the general office will take care of the big costs, and we get more satisfactory results. We have forms something similar to those used by Mr. Menk, on which we keep our costs, and the general office keeps this record on its cost sheet under the heading "Cost of Electric Light and Power," enumerating the different items. This is finally summed up at the end of the year and we get a yearly report, so that all we have to do is to go over these reports and compare them with the total power consumed and we have the total per kilowatt-hour. We have one item "Cost of Producing Electric Light and Power," another "Cost of Electric Machinery," and so on. Each department superintendent has a report something similar to this, which gives him a report of all the different items that comes under his department. In addition to this the electrical superintendent has a report made out monthly for his own benefit, so that he can very readily run over these each month and find out whether our costs are high or low and if they are high, we immediately go back to the time cards and store room orders and trace up the cause.

There is one item which I think we should not overlook, and that is the cost of carrying spares. Some time last fall I got busy and found out that we had too many brass castings. Now we have reduced these about 30 per cent. There are also a number of other spares of which we carry too many—I mentioned brass castings because I was most familiar with them.

C. A. MENK (Homestead Works, Carnegie Steel Co., Pittsburgh):—I am afraid Mr. Gilson did not quite understand the way we arrange our work. To begin with, the charging is not done on the card as it leaves the mill. The card is merely for identification purposes. The system we have in vogue has worked out very successfully and I do not think we put on any additional office force. I do not understand where he gets so many men. One thing which we discovered this last year proved very satisfactory, and that is you must let a man know what it costs him to operate. Since September, we let every department foreman know each month what he has spent that month. This is no secret and it makes him be more careful—it works out remarkably well. We have been doing it now just six months and I dare say we have saved more than the foreman's salary in each case by just showing him each month his expenses. Of course we do not know anything about overhead charges, but we think it a very good idea to let the other fellow know what he is doing.

C. E. BEDELL (Wheeling Steel & Iron Co., Wheeling, W. Va.):—Mr. Gilson comes nearest to expressing my ideas of cost. I would like to ask how many superintendents would like to sit down and write out reports. I believe they

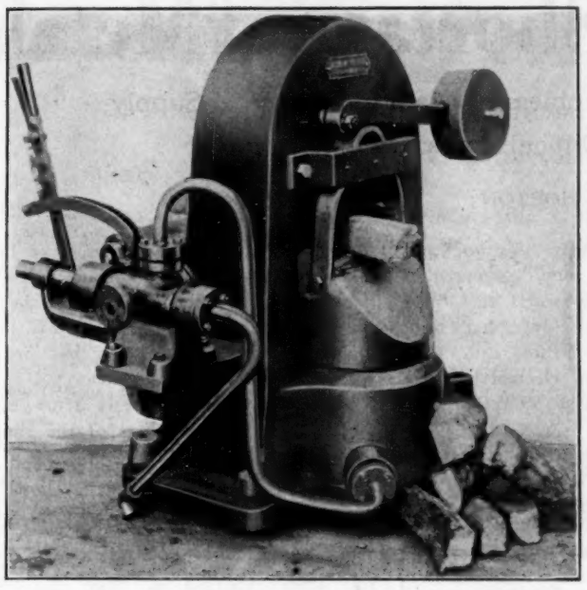

FIG. 1—HYDRAULIC PIG IRON BREAKER FOR FOUNDRY USE

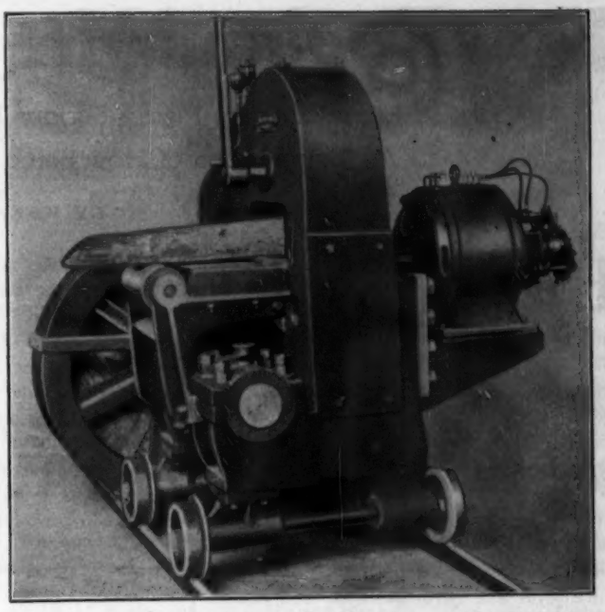

FIG. 2—MOTOR-DRIVEN, PORTABLE PIG IRON BREAKING MACHINE

are more valuable in looking after apparatus than in writing up reports. I think reports are a good thing to have, but it consumes the foreman's time and interest. I think it better to have a clerk make out the report. The same is true of the crane. If the craneman has to make out a report of the condition of the crane, after awhile he will state it is "OK" and be done with it. On the other hand, if he makes out a report when he thinks there is something wrong with it, he will be particular about making out a careful report.

Some time ago I started some reports and the millwright was asked to write out a report as to what he did that day. He did not take the time to answer, but threw up his hands in disgust and gave up his job.

Twenty-two years ago, it is stated, Vancouver, B. C., risked its water supply with a 16-inch steel main, only ⅛-inch thick. An inspection of this main which was made last year demonstrated that the confidence placed in the steel pipe was not unjustified, this very thin pipe being so little affected by corrosion that the engineer who conducted the inspection estimated its life to be at least 25 years.

Machines for Breaking Pig Iron

Machines for breaking pig iron into small sections are not extensively used in the foundries of the United States, notwithstanding their utility and the economies they effect in the breaking of pig metal to suitable lengths for charging. A number of blast furnaces specializing in the production of foundry iron have installed large pig breaking machines and while pig iron broken into small sections can be purchased from almost any furnace, yet the convenience of a tool of this kind can readily be appreciated by any foundryman. In Fig. 1 is shown a hydraulic pig breaker of the Baden Engineering Works, Durlach, Germany, and Fig. 2 is a view of a motor-driven machine which is portable, being mounted on four wheels, and arranged to operate on a track. This machine can be installed in a pig iron storage yard and can be moved from one iron pile to another. Fig. 3 shows the installation of one of these machines in a German foundry convenient to the platform of a hoist leading to the charging floor. The hydraulic machine has capacity of from 10 to 12 strokes per minute and will break pig iron up to 4½-inch square section. The width of the jaw is 11 inches.

The motor-driven machine, Fig 2, likewise has capacity of 10 to 12 blows per minute and the output of both machines per hour is about eight tons each. The motor-driven breaker is built in two sizes, the large machine having a jaw 14 inches wide and a capacity for breaking pigs up to 6 inches square. The machine shown in Fig. 2 will break the pigs to a minimum length of 6 inches and a 10-horsepower motor is required. The weight of breaker and motor is 7,920 pounds; of the hydraulic pig breaker, with controlling gear, 3,080 pounds.

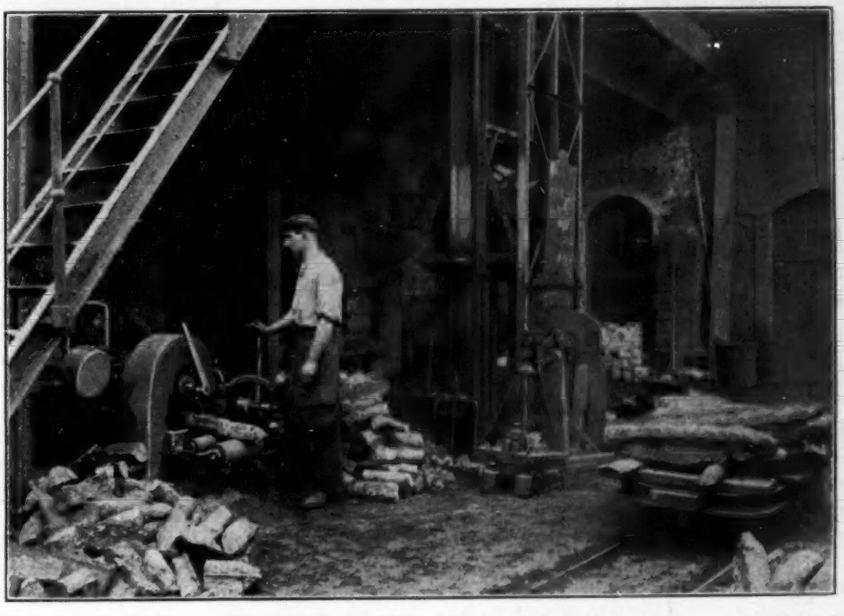

FIG. 3—HYDRAULIC PIG IRON BREAKER INSTALLED IN A GERMAN FOUNDRY NEAR HOIST LEADING TO CHARGING FLOOR

How England Met Shortage of Metals

British Manufacturers Face a Serious Problem in Maintaining Metal Supply—An Explanation of How Some Difficulties Are Being Overcome

BY JOSEPH HORTON

BIRMINGHAM, England, as an important metallurgical center is interested in replacing the metals and materials formerly obtained from Germany. A special meeting of the Birmingham Metallurgical Society was held recently under the direction of Prof. Turner, head of the metallurgical department of Birmingham University to consider the manufacture in Great Britain of materials which have been imported. The Birmingham section of the Institute of Metals, the Staffordshire Iron and Steel Institute and other local societies attended the meeting. England's position in the world's metal markets was outlined in an address by Prof. Turner.

Great Britain, he stated, would suffer little from a shortage of rare metals. The British Empire was the chief producer of gold. Silver has been cheap ever since the outbreak of hostilities. The price has risen lately to 48 cents but this figure is not unusual. Platinum is obtained chiefly from Russia and the supply of this and other metals of the platinum group has not been appreciably affected by war conditions. Of the common metals, iron and steel have increased in price, but the change is less than had been observed frequently in times of peace. Copper can be secured at about $350 per ton. Lead and tin, though rather high, at about $100 and $850 per ton respectively, are still not beyond ordinary market fluctuations. The quotations for lead are exceptional, but tin at $850 is $200 a ton cheaper than it was a few years ago.

The Spelter Situation

Among common metals the chief interest centers in spelter, which is required for producing ammunition cases, condenser tubes, etc. Spelter is now selling for $225 per ton, practically double the price which prevailed during the early months of last year. This is due to the shutting off of the supplies from Germany and Belgium, which were second in importance only to the production of the United States. In Germany, the price of spelter has recently advanced, but not to the level reached in England. An experienced English manufacturer recently stated that spelter would become more expensive than copper. The present price is only two-thirds that of copper.

British manufacturers have devoted more attention recently to the production of zinc and some good results have been secured. Stewarts & Lloyds, of Birmingham, have extended their works, and Chance & Hunt, Ltd., Oldbury, are making an electrolytic zinc which is said to analyze 99.95 per cent pure.

Light steel castings which previously came largely from Germany, are now being made in England in increasing quantities, and several new electric furnaces have been installed.

As a result of the European war, practically every country in the world has been forced to take inventory of its stock of metals. In The Iron Trade Review, Jan. 7, 1915, the strength of the United States in metal resources, was discussed. However, it was emphasized that while this country was the most self-contained nation in the world, there were a number of important minerals which it was forced to import. England has now discovered a like condition. The accompanying article was prepared by Joseph Horton, associate editor of The Iron Trade Review, at its Birmingham, England, office. Mr. Horton discusses the measures taken by England to manufacture at home, some of the metal products which Germany formerly furnished in large quantities.

The shortage of the less common metals and their alloys, some of which formerly were manufactured almost exclusively in Germany has been one of the chief problems of the war. These deficiencies are being overcome gradually. By the electric and other processes, metals are now being produced in England which were formerly purchased abroad.

Of nickel ore, Canada is the chief producer. The metal is refined in the United States and France, as well as in England. Germany, before the war, refined about half the quantity required. Her imports have been curtailed so that there is probably some shortage. Germany had been using a great deal of pure malleable nickel in manufacturing dishes and kitchen ware. A considerable quantity of this material was formerly imported by England. Steps have been taken to meet the domestic demand. Three firms in Birmingham have begun the manufacture of articles of pure malleable nickel. One firm has orders for three months in advance.

Cobalt is obtained chiefly from Canada so little danger exists of the supply being shut off. During the last few years the demand for cobalt has increased, particularly for the production of cobalt steel.

Magnesium was made in Germany and had been exported in large quantities to America and England. The price ordinarily was about $1.87 per pound but it is now selling at $7.62 owing to the shortage and the increased demand. One firm in London has begun the manufacture of magnesium.

Tungsten also is increasing in importance owing to its use for high speed steel and in the pure form. The manufacture of tungsten into bars, rods and wire and electric lamp filaments is new to England although it was established before the war. Germany was the chief maker of tungsten and England is not able to make all the tungsten required. Production is increasing and tungsten is now being manufactured in increasing quantities in a works near London.

Ferro-tungsten, for use in steelmaking is now being produced in Sheffield. England's position in reference to tungsten manufacture is strong as there are large quantities of wolfram ores in the British Empire. Ferro-molybdenum is being made in three localities in England. Formerly, the ore was imported and assayed at the ports, and then sent to Germany to be treated. Now it is being sent to British firms.

Chromium

Chromium is of great importance to the steel industry, particularly in the manufacture of armor-piercing projectiles and shells. An adequate supply of chromium therefore is of great importance to the countries at war. Chrome ores are found in the British Empire and ferro-chromium is now being made in Birmingham. Ferro-chromium and ferro-titanium is also being produced in electric furnaces.

Aluminum was largely made in Germany, but the production in Great Britain and imports from America has largely supplied English needs. The

(*Continued on page* 1084b.)

Entering a Period of Prosperity

Members of National Hardware Association Report Encouraging Improvement in Conditions

That the United States is gradually entering a period of prosperity, was the consensus of opinion expressed by business men from all sections of the United States at the fourth annual meeting of the metal branch of the National Hardware Association of United States, held May 21 and 22 at the Fort Pitt hotel, Pittsburgh. Members of the association described conditions in the southwest, the Missouri valley, New England, the south and the central west as practically normal and almost unprecedented prosperity was predicted for the latter part of this year.

H. E. Nickerson, Congdon & Carpenter Co., Providence, R. I., said machine shops and many mills in the east are operating at maximum capacity. Machine shops in the New England states, he said, are operating day and night to fill orders for war purposes and indications are that purely domestic buying rapidly will improve. F. A. Heitmann, of the F. W. Heitmann Co., Houston, Tex., said conditions in the southwest are slowly improving and he predicted a long continued period of prosperity for the future. Optimistic reports were offered by members from other sections of the country.

About 100 members of the association attended the meeting which opened Friday morning. After a brief talk by W. H. Donlevy, of Carter, Donlevy & Co., Philadelphia, chairman of the metal branch, the report of the metal committee was submitted. The committee touched upon business conditions in general and referred to the abnormal situation resulting from the European war.

Fred M. Fuller, American Sheet & Tin Plate Co., Pittsburgh, read the first formal paper, on "What Can We do to Increase the Sale of Terne Plates"? Frank K. Chew, editor *Metal Worker, Plumber and Steam Fitter*, offered an interesting paper on "Ways and Means by Which the Manufacturers and Jobbers Can Increase the Sale of Their Products".

At the afternoon session, the business outlook was described informally by members from various sections of the country. W. S. Horner, American Rolling Mill Co., Middletown, O., and Edgar Lyon, Lyon, Conklin & Co., Inc., Baltimore, discussed "Service Which the Jobber Renders the Mill in the Distribution of Its Output; How can the Jobber be More Efficient"? Both speakers urged greater co-operation between the manufacturer and the buyer of rolling mill products. William E. Manning, Youngstown Sheet & Tube Co., Youngstown, and Harry L. Doten, Austin & Doten, Boston, informally discussed "Good Buying and Good Selling". Mr. Manning said quality should be primarily considered by both producers and consumers. F. L. Greely, The Herrick Co., Boston, read a paper on "The Shipment of Less Than Carload Lots Direct from the Mill".

After the meeting adjourned, members inspected testing sheds at the Demmler plant of the American Sheet & Tin Plate Co. A smoker was held in the evening at which George P. Early, American Sheet & Tin Plate Co., talked about "Fellowship".

At the Saturday morning session, two of the more important papers to the steel trade, dealing with the spelter situation, were read. "The Reasons for the Advance in the Price of Spelter" were given by W. S. Horner, American Rolling Mill Co., with offices at Pittsburgh, and "The Effect of the Spelter Market on Galvanized Sheets" was described by W. H. Abbott, Wheeling Corrugating Co., Wheeling, W. Va. Both papers covered the respective subjects in a comprehensive manner.

Why Spelter Advanced

"I am not prepared," said Mr. Horner, "to express an opinion whether or not the European war has furnished a sufficient cause for all the advance that has occurred in spelter, but that it has furnished adequate cause for a very considerable advance is beyond question. The condition which the war brought about was that the world outside of Belgium and Germany had been consuming 750,000 net tons a year of spelter, of which 25 per cent had been drawn from Belgium and Germany, while 46 per cent had been made by the United States. If the United States were to step into the place left vacant by Belgium and Germany and furnish this 25 per cent, it would mean an increase of 55 per cent in her own production.

"The new demand upon the United States for spelter and brass may be forecasted at 175,000 to 200,000 net tons a year, representing from 48 to 55 per cent of the United States production in 1913. Naturally so large a demand cannot be created suddenly without the metal becoming relatively scarce. The only question is how scarce, and what price the scarcity will justify, whether three times the low price of 1914 and practically double the highest price prior to the war, or some other higher or lower multiple of these prices. There is also a question whether or not there are concealed speculative stocks in the United States. Obviously if there were such stocks, they would be very carefully concealed, for the holders would be playing for such high stakes that no chances would be taken."

Prizes Awarded

Winners of a prize contest for the best paper on "The Advantages of Terne Plate and Sheet Metals Over Other Materials for Roofing" were announced before the adjournment, Saturday, as follows: First, John Troland, Norwich, Conn.; second, Charles D. Puckett, Dallas, Tex.; third, H. A. Daniel, Newburgh, N. Y.; fourth, Moses Slusky, Augusta, Ga.; fifth, Robert Anderson, Jersey City, N. J. Ninety-two papers were submitted. Judges of the contest were: A. C. Pieper, Bruce & Cook, New York City; W. H. Abbott, Wheeling Corrugating Co., Wheeling, W. Va.; George T. Thomas, Canton Sheet Steel Co., Canton, O.; Frank K. Chew, editor *Metal Worker, Plumber and Steam Fitter*, New York City, and George Smart, editor *The Iron Trade Review*, Cleveland.

W. H. Donlevy, chairman of the metal committee, presided at the sessions. George A. Fernley, Philadelphia, is secretary of the National Hardware Association.

Worcester Pressed Steel Co., of Worcester, Mass., has received three large war orders lately and is busy turning out shells, shrapnels and scabbards. The last contract is for a 4½-inch steel shell for the howitzer type cannon used by the allied armies. These shells are fitted to a brass nose, making an explosive similar in type to the shrapnel shell and of high destructive power. The company is also considering other large war orders.

News of Employers and Employes

V. T. NOONAN

Proposed System of Prizes to Prevent Accidents—Animated Discussion Aroused Over Proposed Rules for Cleaning Rooms—Amalgamated Association Proposed Advance of Wages—Puddlers' Wages Are Increased

THOS. D. WEST

At the meeting held at Springfield, O., May 20 and 21, of the committee entrusted with the framing of rules and regulations for the promotion of safety and sanitation in Ohio foundries, Thomas D. West read a paper on "State Honors for the Best Prevention of Accidents Due to Carelessness", which was endorsed by the representatives of the employers and employes and referred to the industrial commission. Mr. West suggested that the state appropriate $11,000 to be distributed in 10 prizes as follows: First prize, $2,000; second prize, $1,800, and smaller prizes down to $200. Details of the plan are to be worked out, but Mr. West believes that it would be well to allow the companies or firms showing the greatest decrease in accidents due to direct carelessness to distribute the awards among supervisors, safety committees and workmen in proportion to the service rendered in preventing accidents.

The meeting of May 20 was attended only by state officials and members of the committees for the purpose of discussing and preparing the work for the consideration of those to be present at the public hearing the next day, which had an attendance of some 50 persons interested in the work. Victor T. Noonan, the safety director of Ohio, presided at both meetings. The New York rules, in connection with those offered by the executive committee, of which Thomas D. West is chairman, were brought up for further consideration and amendment.

The feature causing most discussion by the employers and labor representatives was a New York rule which states that "The cleaning and chipping of castings shall be done in cleaning rooms, except that where traveling cranes, or where, in present installations, cars are used for conveying castings into such rooms, a separating partition shall be erected which shall be not less than 12 feet in height." The steel founders present sided with J. J. Bever, manager of the foundry department of the Otis Steel Co., Cleveland, in contending that the rule was impractical and would work a great hardship on steel founders. As the labor representatives would not yield to any amendment being made to this clause, it was left in its original form. The rule may be carried to the industrial commission or courts in an effort to have it amended if the labor representatives do not make some concession that may be acceptable to the steel foundrymen.

Much discussion was given the rule, "No cores shall be blown out of castings by compressed air unless such work is done outside the foundry building or after the regular working hours." Several large casting foundrymen wanted this rule changed to permit such work being done in regular working hours by providing screens, but the labor forces would not concede this and the rule was left as above in its original form.

Another rule which provoked much discussion is: "In wash rooms, where 20 or more men are employed, there shall be provided at least one shower bath with an ample supply of hot and cold water, and for every additional 100 men, one additional shower bath shall be provided at the discretion of the industrial commission of Ohio. This rule shall apply to existing foundries." A discussion of this rule, while provoking some amusement, found the majority of the foundrymen present strongly supporting the labor people and it remains as just quoted.

The actions at both the Springfield meetings resulted in some additional amendments being made to the New York rules and the adoption of some tendered by Mr. West's committee that had been left over from the other meeting for the members' consideration.

The fact that the actions of those present at the previous meeting in asking an appropriation by the state of Ohio of $200,000 to help advance its industrial commissioner's effort to reduce accidents, had been well received at the hand of Ohio's governor, Frank B. Willis, lent much encouragement to the hope that the money will be obtained to pay the proposed prizes. The session was closed with short speeches by several of the members. Mr. Noonan made an able plea for all foundry firms to organize safety committees, pointing out in a vigorous, impressive manner that such would greatly assist in helping to reduce accidents.

T. J. Kearns, chief factory inspector of Ohio, commented in a most convincing manner on the importance of employers obtaining the co-operation of their employes, in order to have the greatest efficiency prevail in preventing the injury of their workmen.

John R. O'Leary, vice president the International Molders' Union, complimented in high terms the commendable good spirit and co-operation which all the employers attending the meetings had displayed in their treatment of labor's interest.

J. D. Leary, Leary & Manley Foundry Co., Cincinnati, referred to the excellent good work of Ohio's compensation laws in caring for the injured and the admirable manner in which the industrial commission was conducting this work.

Among those attending were: Victor T. Noonan, director of safety for the state of Ohio; Fred L. Baumgartner, secretary molders' unions, Cleveland; J. A. Oberhelman, Oberhelman Foundry, Cincinnati; John O'Neil, business representative, molders' union, Columbus; J. D. Leary, Leary & Manley Foundry, Cincinnati; G. H. Thompson, Columbus Malleable Iron Works, Columbus; Timothy Rowan, business representative, molders' union, Hamilton; T. J. Kearns, chief factory inspector of Ohio; Peter Curley, deputy factory inspector, Cleveland; C. Titer, deputy factory inspector, Springfield; Thos. D. West, the West Steel Casting Co., Cleveland; H. J. Boggis, Taylor-Boggis Foundry Co., Cleveland; John R. O'Leary, vice president International Molders' Union, Worcester, Mass.

Fifty Years' Service.—At the annual dinner given by the Michigan Bolt & Nut Works to its foremen and heads of departments at the Hotel Statler, Detroit, Daniel Sullivan, who had just completed 50 years of service, was

the guest of honor. The announcement of the dinner contains half-tone engravings of Mr. Sullivan, of President Levi L. Barbour, who has been president since 1913, and of others who have been active in the development of the company.

Puddlers' Wages Advanced

The average selling price of Nos. 26, 27 and 28 gage plain steel sheets, f. o. b. mill, Pittsburgh basis, developed at the bi-monthly examination of sales sheets from selected mills controlled by the Amalgamated Association, in March and April was 1.7086c. Sales sheets of the Brier Hill Steel Co., Youngstown; the National Enameling & Stamping Co., East St. Louis, and the Newport Rolling Mill Co., Newport, Ky., were examined.

The average price of tin plate, during the same period, was $3 per 100 pounds. Sales sheets of the National Enameling & Stamping Co., and the Trumbull Steel Co., Warren, O., were examined.

The average price of bar iron, according to an examination of the sales sheets of the Republic Iron & Steel Co., Youngstown; the Union Rolling Mill Co., Cleveland; the Fort Wayne Rolling Mill Co., Fort Wayne, Ind., and the Highland Iron & Steel Co., Terre Haute, Ind., for the 60-day period ending April 30, 1915, was 1.05c, entitling puddlers to a $5.60 rate for boiling.

Puddlers' wages automatically advanced 10 cents a ton, in accordance with the wage rates adopted for the year ending July 1, next. Sheet and tin plate mill wages will remain unchanged.

Advances in Wages Asked

Pittsburgh, May 25.—Advances in wages for the year beginning July 1 are asked by the Amalgamated Association of Iron, Steel and Tin Workers. Proposed scales, adopted at the convention of the association at Louisville, which opened May 4, have been made public. They will be considered by manufacturers at joint meetings, to be held before the expiration of present scales, July 1. Rather sharp advances are asked for puddlers, sheet and tin plate employes. Advances will not become effective, however, until after the market for finished products manufactured by the three divisions, advances considerably, even though scales are accepted by manufacturers.

Briefly the association asks advances for its puddlers, sheet and tin plate men, bar mill, hoop mill and structural mill employes. It also recommends that working hours in some departments be reduced from 9¼ to 8 hours a day. Sheet and tin mill men now work on eight-hour schedules. The shorter day has been proposed numerous times by the association.

Features of interest in the proposed scale agreed upon by the association are as follows:

Boiling Scale.—An advance of 15 cents a ton above present rates is asked after the 1.25c bar iron card is passed; the scale, up to and including 1.25c card, shows no changes.

Busheling.—The adoption of the 1914-15 wage schedules, with an advance of 5 cents per ton after the 1.30c card is reached is asked for.

Bar and 12-inch Mill. — The committee recommended that base prices be advanced 10 per cent above the base rates of the 1914-15 scale. Similar advances are recommended for plate and tank mill, guide 10-inch hoop and cotton tie mill and special shape mill scales.

Sheet and Jobbing Mill Scale.—The adoption of the revised preamble to the sheet mill scale, adopted at a referendum, is recommended with the words "Pittsburgh basis" stricken out.

Tin Mill Scale.—The adoption of the revised preamble, with the words "Pittsburgh basis" stricken out, was recommended. Rates based on sliding scale with $3.50 named as the maximum. A 10 per cent advance above the 1914-15 scale for heaters and doublers is proposed. The 1914-15 scale, which is suggested, is about 6 per cent above the revised scale. The sheet and tin bar scale of 1914-15 was recommended.

Good Fellowship Club

The Good Fellowship Club of the Cleveland Crane & Engineering Co. will hold its monthly meeting at Wickliffe, O., Thursday evening, May 27, with a dinner at 6 o'clock.

Dr. L. B. Sherry, a member of Dr. Crile's party who spent three months in France after the outbreak of the European conflict, will give an illustrated talk on experiences with wounded soldiers at the American Ambulance hospital, at Paris.

Employes will bring their families to enjoy this affair with them.

Morgan Spring Co., in the Greendale Mass., district is putting up two buildings in order to take care of its increasing business, the plant being operated day and night. One of the structures is an addition to its storage building, which will be 72 x 87 feet, of brick, heavy mill construction, and will cost $25,000. The other is a wooden building to be used as a scrap baling house.

New Epoch

In History of Birmingham Industries Marked by Dock Opening

Birmingham, Ala., May 24.—An epoch in the industrial history of the Birmingham district has been marked by the celebration of the formal opening of Lock 17 on the Warrior river to navigation.

The locks have been completed and the back water has been creeping farther and farther back toward Birmingham until the river now is navigable within 12 miles of the city itself, on a straight line, and for about 40 miles above the lock.

Much interest now is being shown in the Birmingham district in various plans to build a county or city owned railroad, canal or some transportation system between the city proper and the river. Indications are that a railroad system between the city and the first point at which the river is navigable will be the plan decided on by industrial leaders.

At the opening of the locks a great crowd of people from Birmingham left the city via the Southern Railway Co.'s Short Creek branch for Salter's Bluff, a point on the Warrior but 12 or 14 miles from the city, and here a large river excursion boat was boarded and the trip to the locks was made, the remaining 30 miles by water.

The river at Salter's Bluff is about 300 yards wide and easily navigable, it is claimed, the year around. A few miles below this point, the river widens out until at places it is over a half mile wide and from then on to the locks presents a picture of a great navigation stream such as the Ohio and other large rivers.

The completion of Lock 17, which is the last, makes the Warrior, it is claimed, the longest canalized river in the world. The fact that the great natural iron and coal resources of the Birmingham district have at last been placed in touch with the outside world by water transportation is considered by industrial men to mean more for the welfare of the district than probably any other one development that has ever been made in the district. Speeches at the formal opening of the locks were made by United States Senators Oscar Underwood and J. H. Bankhead.

The Jackson Cushion Spring Co., Jackson, Mich., is erecting an addition to its concrete structural steel building and is adding machinery which will more than double its capacity. The addition will be entirely fireproof.

Machine Tool Men at Atlantic City

Situation Created by the War Discussed at Spring Convention of Machine Tool Builders' Association—Meeting a Big Success

DURING the past nine months the course of events in the American machine tool industry has hinged almost entirely on the war in Europe, and the unprecedented conditions which have resulted naturally received a large share of attention at the thirteenth semi-annual convention of the National Machine Tool Builders' Association held at Atlantic City on Thursday and Friday of last week. While a great deal of the discussion of war conditions was either of an informal or executive character, the subject was by no means ignored in the open meetings. Harold C. White's paper, "How to Profitably Operate a Night Force" was of particular value on account of the conditions the war has created and Professor George G. Wilson's address on neutrality dealt entirely with issues raised by the situation abroad.

The convention, which was well attended, was called to order at the Marlborough-Blenheim Hotel at 9:30 a. m., Thursday, May 20, by President W. A. Viall, of Brown & Sharpe Mfg. Co., Providence, R. I. The reports of the membership committee and the treasurer indicated that the association is in a flourishing condition. The chair announced the appointment of the following convention committees:

Auditing:—C. H. Alvord, Hendey Machine Co., Torrington, Conn., chairman; P. E. Thomas, Kempsmith Mfg. Co., Milwaukee, and W. C. Buell, Diamond Machine Co., Providence, R. I.

Resolutions:—A. H. Teuchter, Cincinnati-Bickford Tool Co., Cincinnati, chairman; T. C. Dill, T. C. Dill Machine Co., Chelsea, Mass., and A. B. Iles, International Machine Tool Co., Indianapolis.

Press.—W. A. Viall, Brown & Sharpe Mfg. Co., Providence, R. I., chairman; Chas. E. Hildreth, Whitcomb-Blaisdell Machine Tool Co., Worcester, Mass., and C. L. Taylor, the Taylor-Fenn & Co., Hartford, Conn.

Crest.—Chas. E. Hildreth, chairman; Winslow Blanchard, Blanchard Machine Tool Co., Cambridge, Mass.; E. C. Woolgar, National Acme Mfg. Co., Cleveland, and C. O. Smith.

The catalog committee presented a report recommending that the association's index, which heretofore has been issued in book form, be rearranged and published in the form of a card file. For convenient reference the index is to consist of two parts, a subject index and a manufacturers' index. The guide tabs of the subject index will bear the various subject-heads into which all classes of machine tools will be divided. For instance the subject index card "Drilling" will bear the names of all of the members of the National Machine Tool Builders' Association who are manufacturers of drilling machinery. Detailed information regarding these tools will be printed on cards filed in the manufacturers' index, which will occupy a separate drawer of the cabinet. The manufacturers' index cards will be arranged alphabetically according to names of companies. The obverse sides of the cards will contain printed matter and on the reverse sides will appear line drawings of the various machines. The idea, it was said, was obtained from the "Where-To-Buy Cabinet" issued by *The Iron Trade Review*.

Two papers, "The Application and Use of Time Study Data," by Robert T. Kent, consulting engineer, New York City, and "How to Profitably Operate a Night Force" by Harold C. White, superintendent of assembling, Pierce-Arrow Motor Car Co., Buffalo, N. Y., were presented at the Thursday morning session.

Getting Results from Time Studies

Mr. Kent's remarks were particularly interesting because he pointed out exactly how the time studies were made and applied at Watertown Arsenal, concerning which labor agitators have raised a great hue and cry. He described in considerable detail a method of establishing piece and premium rates by means of time studies covering elemental operations instead of a complete job. Careful time studies are made of all of the elemental operations which may be performed on any given machine and the time required to perform a particular job is computed by making a summary of the elemental operations involved. Under this system, if any man is unable to turn out his work within the specified time, the elemental operation sheets enable the foreman or superintendent to locate the trouble accurately and the man is set on the right track much sooner than would be possible if detailed time study data were unavailable. Under ordinary circumstances a workman whose efforts are unsatisfactory is discharged; under a proper system of scientific management he is taken in hand, his mistakes are rectified and not only is he retained but frequently is able to increase his earnings. Mr. Kent's paper, which contained many suggestions of unusual value, will be published in full in the June 3 issue of *The Iron Trade Review*.

Mr. White's paper on operating a night force is published in full on page 1056 of this issue. The discussion of this paper brought out the opinion that the chief reason why night forces are not as efficient as day workers is found in the fact that men working nights are seldom able to get sufficient sleep and it was suggested that under certain circumstances it might be advisable to provide special quarters for night workers, where they could sleep under practically normal conditions.

The amount of extra pay which should be given night workers also was discussed and it seemed to be the consensus of opinion that this depends on local conditions. Conditions in the labor market, the season of the year, the climate, the attitude of labor unions, etc., all have to be taken into account.

The Thursday afternoon and Friday morning periods were devoted to committee meetings of an executive character. The second and final open session took place Friday afternoon, May 21. A. M. Tilton, president, Drop Forging Co. of New York, Jersey City, N. J., read a paper entitled "Drop Forgings", portions of which are as follows:

"Making the dies is a feature of first importance in the production of drop forgings. To permit the easy removal of the forgings from the dies, a draft of seven degrees is usually allowed, although in some shapes this may be more or less than seven degrees. The allowance for shrinkage is usually 3/16-inch to the foot. For economical reasons dies are sometimes made with only a single forging impression which reduces the first cost of the tools, but forcing the hot metal into its final shape without any preliminary operation may sometimes result most unsatisfactorily, since it is liable to create new internal strains or add to any strains that may have existed in the bar, thereby establishing a center for crystallization when the forgings are in use. By making the dies with at least two impressions, one being merely auxiliary to partially shape the piece, the tendency to introduce additional strains is diminished and the life of the dies is increased.

"The variety of shapes which it is possible to make by the drop forging process is almost unlimited, although some would require so many operations as to make the cost prohibitive. If difficult forgings however are required in sufficiently large quantities, this drawback may be overcome, in a measure, even though three more operations may be required. Very thin pieces or those that are thin with heavier sections at intervals are among the most difficult

shapes to produce because of the rapid cooling of thin parts in the die, which prevents the reduction to size without reheating.

"As nearly as possible it is desirable to make steel forgings at a uniform temperature which is about 1,800 degrees Fahr., except when using tool steel when the temperature should be much lower at the beginning of the operation and inasmuch as the blows of the hammer are not ordinarily sufficiently rapid to maintain the heat, the finishing stroke is made at a slightly lower temperature."

The report of the resolutions committee was presented at the Friday afternoon session, by A. H. Teuchter, chairman. Among other things, it provided that the recommendations of the catalog committee be accepted and that the action of the executive committee in joining the conference on the training of apprentices be approved. An amendment to the constitution was recommended providing that the ex-president be made a member of the executive committee. Section 6, Article IV, of the constitution now provides that the executive committee shall include the president, first vice president, second vice president, secretary and treasurer. The general manager was directed to send a letter of condolence to Stanley Bullard and Mrs. E. B. Bullard, affiliated with the Bullard Machine Tool Co., Bridgeport, Conn., on account of their recent serious illness.

Standard Shapes for Grinding Wheels

R. G. Williams, of the Norton Co., Worcester, Mass., presented a report on behalf of the standardization committee of the grinding wheel manufacturers, requesting the co-operation of the National Machine Builders' Association in the adoption of a schedule of standard shapes for grinding wheels, with the hope that a great many of the grinding wheel shapes now in existence can be eliminated. This report points out that in a great many cases it is found that a standard shape can be used as satisfactorily as a special shape, if a little time and thought are given to the problem. If only standard shapes were manufactured, grinding wheel users would not be obliged to wait for the delivery of special wheels, resulting in a saving of both time and money. Wheels of standard shape, it is also pointed out, have a larger number of cubic inches available for grinding and the price of standard shapes is lower than the price of special shapes; thus, the cost to the user is materially less for each available cubic inch of wheel of standard shape than where special shapes are demanded. Furthermore, only designs will be adopted as standard which are of such dimensions that the proper operating speed can be used with safety. A tentative standardization schedule already has been drawn up and it will be studied and approved in final form with the collaboration of the National Machine Tool Builders' Association.

The convention concluded with a masterly address on the subject of "Neutrality" by George Grafton Wilson, professor of international law, Harvard University.

Sales Record

Shows Value of Indirect Selling, Including Advertising

George D. McIlvaine, secretary of the National Pipe and Supplies Association, 909 Oliver building, Pittsburgh, recently obtained figures from a seller of mill, mine, railroad and contractors' supplies, which show the record of salesmen employed by the company the last three years. Figures were offered at the annual convention of the association at Buffalo early in May. The data were compiled by a representative firm whose name is withheld for obvious reasons. The sales records tell an interesting story.

During the last three years, mail orders of the selected company exceeded direct sales from a monetary standpoint by a slight margin each year. For the three-year period outlined in the table, mail orders ran $7,966.78 ahead of sales made direct by representatives of the company. As salesmen were given credit for all mail orders received within 45 days after the last visit to the customer, the system of checking sales appears to be equitable.

That salesmen give customers the lowest possible price, sometimes referred to as a "confidential inside quotation", as charged by employers who "never covered a territory", is indicated by the records. The average annual percentage of gross profits on personal sales for three years was 18.96 per cent, while the annual average percentage of mail orders was 19.7 per cent for the same period. The company, it is seen, benefited more from mail orders than from direct solicitation. While this comparison is not applicable to all concerns, it tends to show the power of indirect selling, including judicious advertising.

Salesmen were able to obtain premium prices, it appears, in 1913. It was in a part of that year, it will be recalled by readers of *The Iron Trade Review*, that industries throughout the United States were operating at maximum capacities. Salesmen found little difficulty in selling "ahead". In other words, the consuming trade learned to anticipate its future requirements as far as possible. The average cost of securing personal sales business, including salaries and traveling expenses, in 1913 was much less than in either the preceding or succeeding 12-month periods. The figures covering this particular feature are as follows: 1912, 12.4 per cent; 1913, 11.4 per cent; 1914, 15.1 per cent.

Figures showing the average cost of each order taken by salesmen advanced from $1.18 in 1912 to $1.55 in 1913, and to $1.63 in 1914, an annual average of $1.32 for the three years. In other words, it cost $1.32 every time a salesman crossed the threshold of the office of a customer or a prospective customer. It also is noted that the average gross profit on each order taken by salesmen advanced from $5.99 in 1912, to $6.04 in 1913, and to $6.59 in 1914. The average annual net profit however, declined sharply each succeeding year. In 1912, the average net profit for each order booked by salesmen was $2.71; in 1913, $1.95 and in 1914, 44 cents, a decrease of $2.27 in three years.

These figures, of course, apply directly to only one concern, but they vividly tell why so many iron, steel and allied industries faced embarrassing situations in 1914. What little business was obtained in 1914 cost heavily. Like all other progressive concerns, the company giving figures to Mr. McIlvaine increased its sales organization each year, and figures showing results obtained by the sales department might tell an entirely different story if more normal business conditions had been enjoyed during the period covered by the report.

In Worcester, Mass., four new buildings are going up in the Greendale district for manufacturing purposes. The Norton Co., is building a $25,000 addition to its storage building, four stories, 48 x 80 feet, steel frame. The company has received sufficient orders to warrant the starting of a night shift, three nights a week.

Mark & Mohl, Inc., proprietors of ornamental iron works, announce the removal of their office and works from 273 Russell street to Third avenue and Sixth street, Brooklyn, N. Y., to a new building erected from their own plans for a shop designed as an up-to-date structural and ornamental iron works.

E. W. Bliss Co., Brooklyn, N. Y., has opened an office in the Dime Bank building, Detroit, where its customers will be able to secure from engineers the latest information on its entire line of machinery.

Money and Iron: Fact and Comment

Paul Warburg Says the United States Must Be Financially Independent —Industrial Stocks Advance

IN AN address before the Pan-American conference at Washington this week, Hon. Paul M. Warburg, a member of the federal reserve board, said that it must be the aim of the United States from now on to move rapidly toward entire financial independence. He said in part: "Europe has done much in developing both the northern and southern parts of this hemisphere. European banks and bankers have been our staunch and loyal friends in the past. It would be unbecoming in us, and disloyal at the same time, were we to forget this or attempt to profit from their misfortunes. But our own growth and development, and the unhappy fate that has overcome Europe have combined to bring us to a momentous turning point in our economic history. Our own steadily increasing weight and Europe's relatively weakened condition mean that the new world must in the future lean less heavily on the old.

"There is no difference of conservative opinion that the United States does not aspire now to take the place of Europe's leading financial powers. Our own field of operation is still too vast to enable us, or to render it even desirable for us to become the world's banker at this stage of our own development. But the safety of all countries—and we include England among their number—demands that if again the latter should find herself forced to call upon her debtors for instant payment, there should be at least one country strong and independent enough to shoulder a substantial portion of the burden.

"The development of all American nations lies in the same direction, though there will be a difference in degree. It must be the aim of the United States from now on to move rapidly toward entire financial independence. It must be the aim of her sister republics so to divide the credits needed for their further development that the temporary breakdown of one creditor will not seriously embarrass them. They will enjoy the greatest degree of safety in this respect if their creditor nations are geographically, politically and economically separated from one another as far as possible, so that in case one should become involved the other may be expected to remain unaffected thereby. Though in normal times closely connected with Europe, the American continents ought to be so organized as to form a distinct unit in times of emergency—a union whose transportation and credit systems will remain unbroken even though all Europe should go to war.

"An American union of this kind will prove of the greatest economic advantage for all nations concerned. If such a union be thought desirable it must, however, be forged and riveted every day of the year. If it is to stand the test of time and stress, it must be a structure of gradual growth, carefully planned and consistently developed upon a safe foundation."

The Pan-American Conference

Washington, May 25.—Opening of the Pan-American financial conference here yesterday, intended to strengthen the trade relations between the United States and Central and South America, denoted a busy session, which comes to an end here next Saturday, to be followed by a trip by the delegates over the country. Among the delegates attending from this country are iron and steel and metal manufacturers.

It is the hope of the delegates to work out a system of financial co-operation which will enable Central and South America to develop as rapidly as possible the natural resources which they contain, and, because of the European war, this is held to be an especially appropriate time to accomplish these results.

The matter of establishing a merchant marine is going to be one of the principal topics considered. The republics of America are anxiously desirous of becoming independent of European countries for the maintenance of normal commercial relations and eager for the establishment of transportation lines that will not have to take into consideration affairs existing in Europe. Whether constructive work will result from discussion of the merchant marine problem or not, it is asserted it will at least bring to a focus the views of the various delegates, as well as the numerous countries represented. These may be summarized, it is pointed out, with a better opportunity than heretofore has existed of laying the question in concrete form before national legislative bodies.

Financial questions being considered cover the most pressing needs of all the countries of the American continent. The program extends over the entire range of public and private financial needs, as well as the problems of the extension of commerce. According to Secretary of the Treasury McAdoo, the most important results may be secured through the confidential conferences that take place in the respective group committees. Each delegation from Central and South America meets with a group of eminent American financiers and business men from every section of the United States for a frank and free interchange of views. It will require considerable time, Mr. McAdoo said, to bring plans to full fruition, but an important step will have been taken in creating for the republics of the American continent a definite and practical basis for co-operation.

Industrial Stocks

Wall street last week apparently became convinced that the great American industries have not been seriously checked on account of the foreign complications. Following the losses of the two preceding weeks, nearly all industrial stocks made gains last week. Steel common moved up 3⅝ points, after

having lost 2⅛ points in the preceding week. Bethlehem Steel advanced 12½ points following a loss of 10⅝ points in the preceding week. Pressed Steel Car, both common and preferred had a wide range.

The advance started early in the week, for at the opening of the New York stock market Monday prices began to move upward. The announcement of the actual placing of cars by the Pennsylvania system was credited with having a good effect. Tuesday there was a slight tendency downward and the buying public remained out the market.

Break in exchange rates on all of the leading cities of the allied nations had a depressing effect. There were no positive developments Thursday or Friday, but Saturday the tone of the market was distinctly more cheerful and a number of stocks made gains. Quotations at the close of business May 22 and changes in the leading stocks identified with the iron and steel industry for the week are shown in the following table:

	Close May 22.	Net change.
Amer. Brake Shoe & Fdy. Co., ctfs.	101	—1
Amer. Brake Shoe & Fdy. Co., ctfs., prfd.	150	+ ⅞
American Can	35⅞	+3⅞
American Can, prfd.	95¾	+1⅝
Amer. Car & Foundry Co.	53	+4
Amer. Car & Fdy. Co., prfd.	..	.....
American Locomotive	48	+6½
American Locomotive, prfd.	..	.....
American Steel Foundries	34	+3⅞
Baldwin Locomotive	49¾	+7½
Baldwin Locomotive, prfd.	..	.....
Bethlehem Steel	142½	+12½
Bethlehem Steel, prfd.	111	+ ¾
Colorado Fuel & Iron	27⅝	+1⅞
Continental Can	..	.....
Continental Can, prfd.	96	+ ½
General Electric	153½	+6
International Harv. of N. J.	93	+2
Inter. Harv. Corp.	..	.....
Inter. Harv. Corp., prfd.	..	.....
Nat'l Enamel'g & Stamp. Co.	15½	+2
Nat'l Enaml. & Stmp. Co., prf.	..	.....
Pressed Steel Car	45½	+6¼
Pressed Steel Car, prfd.	95⅛	—1⅞
Pullman Palace Car	153¼	— ½
Republic Iron & Steel	28⅞	+3¼
Republic Iron & Steel, prfd.	86¼	+4⅜
U. S. Cast Iron Pipe & Fdy.	17⅝	+2½
U. S. C. I. Pipe & Fdy., prfd.	45⅞	+3⅞
United States Steel	55	+3⅝
United States Steel, prfd.	106	+ ¼
Westinghouse Mfg.	96	+9

Westinghouse Report

The Westinghouse Electric & Mfg. Co., Pittsburgh, reports 4.63 per cent earned on the common stock in the fiscal year ended March 31, 1915, compared with 10.73 per cent the previous year. Sales billed for the year showed a large reduction as compared with the previous year, due chiefly to the unfavorable business conditions during the period, the report says, but partly to the fact that from June 5 to July 13, 1914, the main works at East Pittsburgh, Pa., were practically closed by a strike of the operatives. The reduction in sales billed largely accounts for the reduction in net income, but it was also affected by the conditions due to the strike. All the extraordinary expenses caused by the strike as well as the factory and general expenses during the strike were charged against the income for the year. The income account compares as follows:

	1915.	1914.
Gross sales	$33,671,485	$43,733,646
†Costs	31,109,074	39,016,423
Mfg. profit	2,562,411	4,717,222
Other income	1,158,527	1,280,856
Total income	3,720,939	5,998,078
Interest	1,354,126	1,706,006
Depreciation, etc.	357,069	233,264
Total deduction	1,711,195	1,939,269
Surplus	‡2,009,744	4,058,809
Prfd. dividends	279,909	279,909
Common dividends	1,427,350	1,405,989
Balance	302,485	2,372,911
Adj. credit	82,553	594,974
Prev. surplus	7,659,130	7,348,522
Total surplus	8,044,168	10,316,407
Depr. of inv.	.....	2,286,590
Misc. deduct	570,757	370,687
Profit and loss surp.	7,473,412	7,659,130

‡Equal to 4.63 per cent on $37,325,087 outstanding common stock, after deducting preferred dividends, as compared with 10.73 per cent earned on $35,193,237 outstanding last year.

†Factory cost, including betterments and extensions, also inventory adjustments, selling, administration, general and development expenses.

The value of unfilled orders on hand (not including subsidiaries) as of March 31, 1915, was $8,951,410. This compares with previous years as follows:

Value of unfilled orders on hand:

March 31, 1914	$ 7,951,385
March 31, 1913	12,061,473
March 31, 1912	8,137,961
March 31, 1911	7,616,058
March 31, 1910	11,256,196
March 31, 1909	7,583,435
March 31, 1908	7,522,262
March 31, 1907	14,237,212
March 31, 1906	9,916,210
March 31, 1905	7,149,021

Ovens Are Fired

St. Louis, May 25.—The ovens in the $2,000,000 by-product coke plant, erected by the Laclede Gas Light Co. on the site of the old Vulcan Iron Works in Carondelet, South St. Louis, were fired for the first time, Friday, May 21.

The plant, which is the first of its kind west of the Mississippi river, and one of the largest in the country, comprises nine buildings on a 182-acre tract. Domestic consumers of coke, it is estimated, will be afforded a saving of $500,000 a year as a result of the opening of the plant, about June 15.

There are 56 ovens, with a daily capacity of 13½ tons to the oven. The coal will produce, it is said, 11,000,000 cubic feet of gas a day, about 5,000,000 cubic feet of which will be used in heating the ovens of the plant.

War Order Suit

Submitted to Court—Max Pam Appears for Allis-Chalmers Company

Milwaukee, May 25. — After hearing arguments by Max Pam, of Chicago, for the Allis-Chalmers Mfg. Co., of this city, and General Otto Falk, its president, and by Henry Cochems for Samuel Pearson, in the suit of the latter against the former, Circuit Judge Turner has taken the case under advisement.

It will be remembered that "General" Pearson brought suit against the Allis-Chalmers Mfg. Co. and President Falk under the "discovery" statute of Wisconsin to obtain information relative to the relations of the Allis-Chalmers Mfg. Co. and the Bethlehem Steel Co. in work being done upon munitions of war. The hearing, at which arguments were made, was on a petition to have the subpoena quashed. This subpoena has ordered President Falk to produce papers relating to the contract between his company and the Bethlehem Steel Co.

"The act of the defendant consisted of the manufacture of shrapnel intended solely and singly for the purpose of destroying life and property," said Mr. Cochems. "That act is absolutely immoral."

Mr. Pam argued that the attempt of an individual who has no interest in a company to delve into its affairs in a court of equity is unprecedented; that "criminal conspiracy" is charged in the plaintiff's affidavit, and that consequently President Falk cannot under the United States constitution be required to testify against himself; that all laws and precedents of the United States, together with Secretary Bryan's note to Germany and President Wilson's neutrality proclamation, state that it is legal for a citizen of a neutral country to manufacture ammunition for a belligerent.

Pullman Exhaust Ventilator

The Pullman Automatic Ventilator Mfg. Co., of York, Pa., announces that, after considerable experimenting, it has developed and is ready to place in the market a small ready-to-run exhaust ventilator. The new device has a number of new and well-thought out features. It is called the Pullman Whirlwind Exhaust Ventilator. A booklet is being issued, which may be secured by addressing the manufacturer and mentioning this paper.

Chicago Bearing Metal Co., 2220 West Forty-third street, is installing a Snyder electric furnace for melting brass.

Heavy Demand From Italy for Tools

But Few Orders Are Placed Owing to Tie-Up in Orders for Future Delivery—

Pittsburgh Dealers Expect Pennsylvania Railroad's List Shortly

THE FEATURE of interest in the machinery market now is the tremendous demand for machine tools from Italy. That country ever since the outbreak of the war last August has been a good buyer of all kinds of equipment and especially such apparatus as is needed in the manufacture of war munitions. Last week when every indication pointed to Italy's early participation in the hostilities, the demand from that country suddenly outgrew all previous proportions. Although the demand is great, the orders placed so far have been few owing to the manner in which the machinery wanted is sold-up for future delivery. One large dealer on Thursday and Friday was forced to refuse firm orders for fully 300 lathes for immediate shipment which were cabled from Italy. It generally is believed that as soon as present conditions in the machinery market in this country become known in Italy, a large amount of business for future shipment will be booked from that country. Demand from France, Russia and England, for equipment to be used in the manufacture of shrapnel and other war munitions, continues as large as before.

Domestic purchasing of machinery for making war supplies also continues active although not of such large proportions as in previous weeks. Among the most notable new purchases, are those of the Providence Engineering Co., Providence, R. I., and the Poole Engineering Co., Baltimore, both of which concerns have placed orders for large quantities of equipment to make projectiles. Further large orders have been placed by the Baldwin Locomotive Works, by the Westinghouse Electric & Mfg. Co. and by the Winchester Repeating Arms Co., New Haven, Conn. Further shrapnel contracts are being negotiated, so that the placing of much more business of this character is expected shortly. The E. W. Bliss Co., Brooklyn, N. Y., which has been one of the biggest domestic buyers since the outbreak of the war, again is in the market on a large scale and among other machines, is inquiring for 100 lathes, 50 3-inch turret lathes and 50 vertical drills. The Morgan Engineering Co., Alliance, O., is in the market for 10 lathes. E. R. Caldwell & Co., 25 Broad street, New York, are in the market for a large amount of all kinds of machinery for making projectiles. It is understood the American Clay Machinery Co., Willoughby, O., is going into the manufacture of projectiles. This concern is in the market for hydraulic presses. Purely domestic business is improving and machinery sellers report a better volume of business from practically all lines of industry, including such as are not identified with the war business.

The General Electric Co., which has not been buying much of its usual run of equipment lately, but which normally is one of the best buyers in the east, again is putting out miscellaneous inquiries. The Delaware, Lackawanna & Western railroad has placed orders for a steam hammer and bolt cutter and probably one or two other machines. It now is in the market for another bolt cutter. Practically the only other inquiry from an eastern railroad is that of the Seaboard Air Line, which is taking preliminary figures on three cranes to be installed in the shops that are being erected at Portsmouth, Va., to replace those recently burned. One of these cranes will be 160 tons capacity and the other two 10 and 15 tons, respectively. The Duriron Iron Casting Co., 90 West street, New York, is in the market for a 5-ton crane for installation at its plant in Dayton, O. The Balbach Smelting & Refining Co., Newark, N. J., is inquiring for a five and 10-ton crane. The United States Cast Iron Pipe & Foundry Co. has bought eight core hoists for its Bessemer, Ala., plant. Lewis F. Shoemaker & Co., Pottstown, Pa., have bought two 5-ton Pawling & Harnischfeger cranes. The Treadwell Engineering Co., Easton, Pa., has decided not to purchase the cranes it recently inquired for. The Warren Foundry & Machine Co. still is negotiating on 10 or 12 cranes, included in its recent inquiry. Among eastern concerns who are expanding their plants are the Eastern Machine Screw Co., New Haven, Conn.; the Hartford Machine Co., Hartford, Conn.; the Scoville Mfg. Co., Waterbury, Conn., which is putting up extensions in addition to those reported previously, and the Standard Chain Co., York, Va., which will build a new plant.

Pittsburgh Hopes P. R. R. Will Buy Tools

The placing of orders for freight and passenger car equipment by the Pennsylvania railroad leads Pittsburgh machine tool dealers to believe that the company soon will issue formal lists for machine tools for shops in Pittsburgh and adjacent territory. While officials of the railroad advise that formal lists are not being prepared, yet it is known shop superintendents a few weeks ago submitted requests for machine tool appropriations. Car builders who will furnish equipment are buying additional machinery, but details of orders are lacking. The Westinghouse interests continue to book huge orders for war material and additional inquiries for machine tools have been sent out quietly. The Crucible Steel Co. of America has awarded the Morgan Engineering Co., Alliance, O., contracts for crane equipment for extensions to the Atha plant at Harrison, N. J.; the contract will involve at least 19 cranes. The Carnegie Steel Co. has awarded four 10-ton electric cranes to the Alliance Machine Co., Alliance, O., and the Cambria Steel Co., Johnstown, has ordered an electric charging larry for its by-product coke oven plant from the Alliance company.

Domestic Business Inactive at Chicago

While the demand on the part of European and Canadian manufacturers for lathes and screw machines continues unabated and standing orders are held by Chicago dealers to ship whatever tools of this nature can be obtained, domestic business is not active. Inquiry from ordinary lines of trade is irregular and a week of comparative activity may be followed by one of almost absolute quiet. Since possible complications may follow the Lusitania disaster, many prospective buyers appear to have halted to await eventualities and trade is feeling the result. It is difficult to separate demand which is contingent on war operations from that which is entirely peaceful and investigation in many cases reveals the former, where no evidence of its being otherwise than peaceful is apparent at

Selected "Where Quality Counts!"

In the plant of the **Ford Motor Co., Detroit, Mich.,** where all the best efficiency methods are in use, where men are treated as men, and where every possible means is used for protecting health and improving service, ***you will find Ayer & Lord Wood Blocks.*** They did not get there by accident. They are the result of careful investigation; long deliberation. The particular installation above shows a loading and unloading platform where the roughest of service is a daily practice.

Once a User, Always a User!

"A year ago we floored one end of our mill with Ayer & Lord Tie Company's blocks with results that are entirely satisfactory. During the month of November we put down another section of the same material which is the best evidence that we are pleased with the blocks and the completed floor.

"We highly recommend it for rolling mills or other factories where heavy weights are moved by trucks."

Let us send you our interesting booklet
"FLOORS"

Ayer & Lord Tie Company

General Office: Railway Exchange, Chicago

CLEVELAND, OHIO
926 Illuminating Bldg.

MEMPHIS, TENN.,
1402 Exchange Bldg.

KANSAS CITY, MO.,
1117 Rialto Bldg.

PHILADELPHIA, PA.
319 Perry Bldg.

first sight. A Canadian buyer placed an order for nearly $10,000 worth of machine tools in Chicago a day or two ago, including a number of heavy duty drills. This indicates a change in the nature of machinery desired for war purposes, smaller projectiles with high explosives now being manufactured instead of the entire output being shrapnel. Heavy duty drills are employed for drilling out the center of billets before the outside is turned, forgings not being used for this form of projectile. Domestic business hinges largely on the question of delivery and from four to six months is about the best that can be obtained from manufacturers on orders placed now.

The Allis-Chalmers Mfg. Co., of Milwaukee, is adding to its plant following its policy of concentrating its entire works at West Allis, a suburb of Milwaukee, and is inquiring for some equipment. The Santa Fe has not yet closed its inquiry for machine tools but has been adding somewhat to its original list. The Burlington has its bids tabulated and there is every expectation the machinery will be bought during the present week. No word has been received from the North-Western as to its forthcoming requirements.

Few Inquiries at Cincinnati

In Cincinnati, the rumored railroad lists for machine tools have not appeared. It is probable that the railroads will continue to buy single tool lots for several months. A slight demand is developing for automatic machines for shrapnel shell parts manufacture, and the Computing & Recording Machine Co., Dayton, O., is in the market for several machines. Sales of radial drills show a small increase, the demand coming from domestic sources. Milling machines also are in demand. Several small inquiries for planers are out but planer manufacturers are busy turning out parts for lathes. Orders and inquiries for lathes are much larger than for any other class of machine tools.

EASTERN STATES

BRIDGEPORT, CONN. — Locomobile Co. of America has started work on a 1-story, 50 x 56-foot addition. It also has let contract for still another addition, four stories, 54 x 103 feet.

HARTFORD, CONN. — Hartford Machine Co., 476 Capital avenue, has let contracts for a 4 and 6-story addition, 47 x 206 feet.

NEW HAVEN, CONN.—Eastern Machine Screw Co. is about to start work on a 1-story, 41 x 80-foot addition.

NEW HAVEN, CONN.—H. B. Ives Co. is taking bids on a new 1-story, 24 x 44-foot boiler house.

NEW HAVEN, CONN.—G. F. Warner Mfg. Co. has started work on a 1-story, 22 x 42-foot addition.

NEW HAVEN, CONN. — Westinghouse, Church, Kerr & Co., 37 Wall street, New York, have the contract for another 3-story and basement, 41 x 62-foot gun factory to be erected in New Haven for the Winchester Repeating Arms Co. This company has placed orders for considerable additional machine tool equipment.

WATERBURY, CONN.—Scoville Mfg. Co. has started work on a 1-story, 46 x 100 feet, addition.

BROOKLYN.—E. W. Bliss Co. has put out an inquiry for 100 lathes, 50 vertical drills and 50 3-inch turret lathes and other equipment.

BROOKLYN. — Sanlis Realty Co., 299 Broadway, New York, is taking bids on a 4-story, 105 x 177-foot building to be erected at Atlantic avenue and Elton street, to be rented for manufacturing purposes.

ELMIRA, N. Y.—Special Metals Co., castings, appliances, products, has been incorporated; $250,000 capital stock; by C. and C. S. Lattin, H. H. Mills, 1211 Grand Central avenue.

FULTON, N. Y.—Oswego Falls Pulp & Paper Co. has increased its capital stock from $30,000 to $600,000, and will add two large buildings to its plant in Fulton.

LONG ISLAND CITY, N. Y.—Courtney Development Co., 1123 Broadway, New York, has let contract for a 1 and 2-story, 235 x 265-foot manufacturing building to be erected at Annabel and Gossman avenues here.

NEW YORK. — Robbins Conveying Belt Co. is in the market for a hand bending roll.

NEW YORK. — Delaware, Lackawanna & Western railroad has bought a steam hammer, a bolt-cutter and one or two other machines. It now is taking bids on another bolt-cutter.

NEW YORK.—Central Station Equipment Co., construction, electrical works, has been incorporated; $10,000 capital stock; by J. Sarano, J. Landers and F. C. Joutras, 114 Liberty street.

NEW YORK.—E. R. Caldwell & Co., 25 Broad street, are in the market for a considerable quantity of projectile-making equipment.

NEW YORK.—De Mayo Operating Co., conveying systems, machines, devices for coal, sand and grain, has been incorporated; $400,000 capital stock; by L. A. De Mayo, G. E. Learned, J. T. Abell, 1 Broadway.

NEW YORK.—Primax Motor Co., machinery, mechanical apparatus, etc., has been incorporated; $10,000 capital stock; by J. Karpa, H. Gabel and A. Kaiser, 101 West Eightieth street.

MOUNT KISCO, N. Y.—Municipal Lighting Co., gas, electricity, etc., has been incorporated; $100,000 capital stock; by R. Roome, J. Lennox Banks Jr. and J. Zeppa, 110 West 124th street, Manhattan.

ROCHESTER, N. Y.—Floesch Construction Co., engineering, contracting, has been incorporated; $100,000 capital stock; by John F. Connor, John F. Allen and Jacob M. Floesch, 3 Argyle street, Rochester.

SCHENECTADY, N. Y.—General Electric Co. has put out inquiries on a dudgeon press and several other machines.

PHILADELPHIA.—Samuel Yellin, 217 Jefferson street, will build a 2-story, 40 x 100-foot ornamental iron foundry at Arch and Allison street. Architects Mellor & Meigs, 205 South Juniper street, are taking bids.

YORK, PA.—Standard Chain Co., 41 Small building, will build a 1-story, 220 x 330-foot plant on east Princess street.

BAYONNE, N. J.—Vacuum Oil Co. has let contracts for the erection of six buildings.

EAST ORANGE, N. J.—Jas. L. Mason, 118 Harrison street, is receiving bids on a 1-story, 24 x 57-foot factory building, to be erected at 84 Delancy street.

HALEDON, N. J. — Probst Adjustable Brackets, hardware, etc.; $50,000 capital stock; by Rudolph Glaser, Haledon; Ernest Probst, Louis Mai and John McLuckie, Paterson.

JERSEY CITY. — Warehouse Construction Co. has been incorporated; $100,000 capital stock; Frank Stevens, Henry O. Ames, George F. Lahey Jr., all of Jersey City.

JERSEY CITY.—Dooley Construction Co. has been incorporated; $100,000 capital stock; by John W. Dooley, Plainsfield, N. J.; William McMillen, East Orange, N. J.; Alexander B. Ciciuch, Jersey City.

LITTLE FALLS, N. J.—F. J. Marley Construction Co. has been incorporated; $50,000 capital stock; by William J. Wilson, Passaic, N. J. and Francis J. Marley.

NEWARK, N. J.—Balbach Smelting & Refining Co. is in the market for a 5-ton and a 10-ton crane.

WILMINGTON, DEL.—Wilmington Fiber Specialty Co. has let contract for a 1 and 2-story, 112 x 130-foot addition.

WASHINGTON.—Bureau of supplies and accounts, navy department, is receiving bids until June 1 on an electric locomotive for Portsmouth, Va., and for a cutting-off machine for Washington.

CENTRAL STATES

AKRON, O.—Punctureless Auto Tire Co., recently incorporated at $100,000 by Will Price and others, will locate its offices in Akron although the plant may be situated elsewhere.

ALLIANCE, O.—Morgan Engineering Co. is inquiring for 10 lathes.

ASHLAND, O.—D. F. Hay, chairman of the county commissioners, will receive bids until June 14 for the construction and permanent replacement of the following bridges: Hamilton bridge, Ruggles township, 60-foot, solid riveted truss, 14-foot roadway; Edward Wiley bridge, Orange township, 80-foot solid riveted truss, 16-foot roadway; Semple ditch bridge, Montgomery township, 50-foot solid riveted truss, 16-foot roadway; Joseph Sheets bridge, Montgomery township, 80-foot, solid riveted truss, 16-foot roadway; John Snyder bridge, Mohican township, 40-foot solid riveted truss, 16-foot roadway.

CINCINNATI.—Universal Metal Fence Post Co., recently incorporated, advises that it will not require shop equipment.

CINCINNATI.—Some light machine shop equipment will be required by the Towle-Cadillac Co., which will build a 2-story garage building, 60 x 75 feet.

CINCINNATI.—Stacey Bros. Gas Construction Co. is having plans prepared by Harry Hake for a 1-story, 100 x 400-foot, steel and brick factory building, and a 32 x 46-foot power house, to be equipped with gas engines with direct drive to generators; individual motors will be used throughout the plant. The company will manufacture gas oven outfits, including tanks and holders and expects to have the plant in operation by Oct. 1. The incorporators are: J. E. and A. J. Stacey and A. L. Pope. The latter will be secretary and treasurer.

COLUMBUS, O.—A syndicate of business men has revived the plan of erecting a $1,000,000 union terminal station in the center of the city. Frank L. Packard, architect, has been instructed to revise plans.

DAYTON, O.—Duriron Casting Co. is in the market for a five-ton crane.

HENDERSON, KY.—S. C. Schaeffer, has

let a building contract for an excelsior factory and has begun the purchase of equipment.

LEXINGTON, KY. — Twentieth Century Metallic Packing Co., recently organized in Lexington to manufacture an automobile specialty, will locate its plant in Detroit, Mich., it is stated. E. J. Welch, Detroit, is the head of the concern.

LOUISVILLE, KY.—J. F. Kurfees Paint Co. is completing the erection of a 4-story, factory building and is about ready to purchase electric motors and special equipment.

MAYSVILLE, KY.—Model laundry is purchasing steam plant equipment and special machines for its new plant.

OWENSBORO, KY.—River Sand & Gravel Co. will purchase steam derricks and other machinery for its new plant.

OWENSBORO, KY.—International Ditching & Road Machinery Co. has been incorporated; $50,000 capital stock; by W. E. Williams, C. A. Rogers and J. C. Bunch.

PADUCAH, KY.—S. Foreman has organized a company with $100,000 capital stock to build a machine shop and garage.

ANDERSON, IND. — Hill Standard Mfg. Co. maker of children's vehicles has prepared to manufacture motor vehicles to be propelled by small electric motors. Hugh Hill is president.

CONNERSVILLE, IND.—Home Lighting Co.; home lighting plants, has been incorporated; $10,000 capital stock; by George Cain, F. J. Snider, J. M. Ahlegen.

EVANSVILLE, IND.—James Bradley, R. A. Graham, and C. S. Winston are planning the establishment of a plant to manufacture tractor cultivators and other farm machinery.

GALVESTON, IND.—Galveston Light & Power Co. has been incorporated to establish a light and power plant; $10,000 capital stock; by C. W. McReynolds, W. H. Arnold and W. H. Arnett.

GOSHEN, IND.—Goshen Stamping & Brass Co. will erect a 21 x 87-foot addition to its plant. Ike Miller is contractor.

INDIANAPOLIS.—Citizens Gas & Electric Co. has awarded the general contract for a benzol plant to Otto Cooling Co., 6 Church street, New York City, including a brick and steel building, one story, 60 x 180 feet.

LAPORTE, IND. — Laporte Outing Sulky Co. is in the market for equipment for its new plant.

MARION, IND. — Klaeb Gas Stove & Heater Co. has been incorporated to manufacture gas burners; $10,000 capital stock; by Joseph A. Klaeb, Henry Burger and F. A. Burger.

MILTON, IND.—The board has granted a franchise to the Connersville company to erect an electric light and water works plant along the river at Milton.

MONTICELLO, IND.—A. G. Fisher, county auditor, has plans and will open bids, June 9, for the construction of a bridge.

MUNCIE, IND.—Ball Bros. Glass Mfg. Co., F. C. Ball, president, has had plans drawn by Cuno Kibele, 333 Johnson building, for a factory and administration building, 90 x 218 feet, of brick and steel.

SOUTH BEND, IND.—South Bend Brass Foundry & Machine Co. has been incorporated; $15,000 capital stock; by George H. Thayer Jr., F. N. Troupe and P. M. Thayer.

TERRE HAUTE, IND.—American Molding Machine Co. has been incorporated to manufacture molding machines; $20,000 capital stock; Lewis J. Cox, W. L. Norcross and W. C. Ely.

TERRE HAUTE, IND.—Indiana Gas & Coke Co., which recently increased its capital stock from $10,000 to $2,500,000, will erect a $500,000 coke plant near Terre Haute, probably within the next few months, and it is expected the ovens will be in operation before the end of the year. Paul N. Bogart is one of the promoters.

WASHINGTON, IND.—L. S. Core, county auditor, will open bids June 3 for the construction of bridges including the following: The Becker bridge, 36-foot, steel span; Arvin bridge, 40-foot, steel span; Malloy bridge, 24-foot, steel span; Meredith bridge, 28-foot, steel span; and the Byrow bridge, 40-foot, steel span. Plans are on file with the auditor.

"Take a Little Tip From Father"

Once upon a time,
The Old Man Put Over this Gem:
"A little TIP will sink a Ship."
The Editor of this Column offers the Subsequent Contribution:
"A little TIP, perhaps a Trip,
You have an ORDER, on the Hip."
As all stories headed, "Once upon a time," must have a moral, Here goes:
TIPS are little but they GET the BUSINESS.
Here is where YOU find THEM,
EACH WEEK.

E. W. Bliss Co., Brooklyn, has put out an inquiry for 100 lathes, 50 vertical drills and 50 3-inch turret lathes and other equipment.

Morgan Engineering Co., Alliance, O., is in the market for 10 lathes.

American Clay Machinery Co., Willoughby, O., is in the market for hydraulic presses.

Duriron Casting Co., Dayton, O., is inquiring for a 5-ton crane.

General Electric Co., Schenectady, N. Y., has put out inquiries for a dudgeon press and several other machines.

Balbach Smelting & Refining Co., Newark, N. J., is in the market for a 5-ton and a 10-ton crane.

E. R. Cadwell & Co., 25 Broad street, New York City, are inquiring for a considerable quantity of propectile-making equipment.

Jackson Railway & Light Co., Jackson, Tenn., is in the market for a wheel press.

Delaware, Lackawanna & Western railroad is taking bids on a bolt-cutter.

Seaboard Air line is taking preliminary bids on a 160-ton, a 10-ton and a 15-ton crane. It also is taking preliminary bids on equipment to replace that recently damaged by fire at its shops.

Kilby Locomotive & Machine Works, Anniston, Ala., will build a malleable foundry and is in the market for equipment.

James Bradley, R. A. Graham and C. S. Winston, Evansville, Ind., are planning the establishment of a plant for the manufacture of tractor cultivators and other farm machinery.

AURORA, ILL.—Conklin Automatic Carburetor Co. has been incorporated; $25,000 capital stock; by E. R. Conklin, James Little and J. W. Lilley.

CHICAGO.—Oliver Typewriter Co., 159 North Dearborn street, has increased its capital stock from $2,000,000 to $2,500,000.

CHICAGO.—Hahn Brothers Laundry Co., 1144 West Superior street, is about to build an engine room, 48 x 110 feet.

CHICAGO. — Proposed central produce market is to include an 8-story cold storage building and power house, among other structures, all of reinforced concrete. Anderson Pace, 84 South Water street, is secretary.

CHICAGO.—Link Belt Co., through the General Machinery Co. its agents at Woodward, Ala., has taken a contract at about $30,000 for installing the fourth unit of the coal washer, of concrete and steel.

CHICAGO.—E. H. Strand & Co., 55 West Kinzie street, dealers in machinery have plans by Gibbons Uffendell, 39 South State street, for a factory building, two stories, 26 x 55 feet, steel construction.

CHICAGO.—A. Finke & Sons Co., 2000 Kingsbury street, manufacturer of drop forgings, has bought a site for a plant covering about 35,000 square feet of floor area and will build soon.

DETROIT.—Great Lakes Realty & Building Co., John R. Nostrand, secretary, is having plans made for a 20-story office building at Michigan and Washington streets.

DETROIT.—Universal Rotary Brick Machine Co., Detroit and Chicago, has been incorporated; $100,000 capital stock; by J. E. Rush, Detroit, and others.

DETROIT.—Brown Metallic Products Co. has been incorporated; $10,000 capital stock; by R. Harry Brown, Claytice W. Brown, G. Edwin Chamberlin.

DETROIT.—Detroit Stamping Co. has been incorporated to manufacture dies and sheet metal stampings; $10,000 capital stock; by W. H. Roberts, Fred Haskel and Earl W. Roberts.

LANSING, MICH.—Auto Wheel Co. is to build an addition, 60 x 160 feet, at its plant.

MUSKEGON, MICH.—United Home Telephone Co. has sold $200,000 worth of bonds, $150,000 of which will be used in extending its plant and equipment in Muskegon.

PORT HURON, MICH.—Port Huron Engine & Thresher Co. has accepted plans for its new plant including machine shop, forge shop, casting storage house, erecting and testing shop, boiler shop, tin shop, foundry and pattern storage house.

SAGINAW, MICH.—J. D. Swarthout Co. has been incorporated to manufacture steel specialties by J. D. Swarthout, E. M. Swarthout and E. C. Graham.

CHILTON, WIS.—A general machine shop is being established in the plant just vacated by the Steiner Mfg. Co., gasoline engines, by John Steiner, who has purchased the property. The engine company has moved its equipment to Plymouth, Wis., where local capital is assisting in the establishment of a larger plant.

LODI, WIS.—A general machine shop has been established in the former Nott building on Main street by Ed. Forsberg and L. E. Daniels, Chicago. For the present they will not undertake machinery construction but do only general repair and rebuilding work.

MADISON, WIS.—E. E. Parker, city en-

gineer, is preparing plans for a pumping plant and equipment costing $10,000.

MANITOWOC, WIS.—Aluminum Castings Co. of Cleveland, denies all rumors to the effect that it will build an addition to its plant at Manitowoc.

MARSHFIELD, WIS.—Felker Bros. Mfg. Co., steel culverts, barn equipment, etc., has broken ground for the addition projected earlier in the year, and to be devoted principally to metal-working. It will be of brick and steel, 40 x 80 feet, and one story high.

MILWAUKEE.—L. J. Petit, care Wisconsin National bank, is considering erecting a 10 to 16-story bank and office building.

MILWAUKEE. — The lighthouse inspector will take bids until June 1 for two compact marine boilers.

MILWAUKEE. — Garage Equipment Mfg. Co., 742 South Pierce street, has changed its corporate name to the Gemco Mfg. Co., Frank T. Discher is president and general manager.

MILWAUKEE. — Wisconsin Hydro-Stone Mfg. Co. has been organized with $25,000 capital by Bernard Does, Charles Marnit and Robert J. Barth to manufacture a patent concrete block and similar building materials.

MILWAUKEE. — A 2,500,000-bushel grain elevator costing approximately $500,000 with equipment, will be erected in the Kinnickinic river valley at Milwaukee, by the Chicago & North-Western railroad. Plans are being drawn by the Foltz Engineering Co., St. Paul, Minn. The work will be under the supervision of W. W. Finley, chief engineer of the North-Western.

MILWAUKEE. — Alex G. Goethel Sheet Metal Works, recently incorporated to succeed the personal business conducted by Alex G. Goethal at 90-92 Second street, has moved to its new home at 818-820 Winnebago street, built especially for the purpose. The company is capitalized at $25,000 and manufactures all kinds of sheet metal work, ventilating, blow and dust-collecting systems, etc. The officers are: President, Alex G. Goethel; vice president, Edwin Keller; secretary-treasurer, Edward Spetter.

WITTENBERG, WIS. — A bond issue of $10,000 for the construction of a municipal waterworks system for fire protection was adopted at a special election. Plans have been prepared by Madison engineers, as previously noted. John Englund is village clerk.

WEST BEND, WIS.—West Bend Plating Co., recently reorganized for enlargement, is adding considerable new equipment for handling large work. A battery of four 100-gallon vats is included.

KANSAS CITY, MO.—Kansas City Auto Parts Co. has been incorporated; $200,000 capital stock; by Gustave Nelson, Otto H. Nelson and L. E. Kempton.

KANSAS CITY, MO. — Otto H. House, Leavenworth, Kan., is about to erect an $18,000 building at Seventeenth and Oak streets for manufacturing purposes, two stories designed to carry four, 83 x 105 feet, steel girders and columns. Boiler equipment is needed.

ROCKPORT, MO.—Water works improvements are to be made at a cost of $12,000, including a 6 x 8-inch deep well pump, a 15 horsepower electric motor and water mains.

ST. JOSEPH, MO. — Missouri & Kansas Steel Tank & Mfg. Co. has been incorporated; $16,000 capital stock; by E. F. Yale, J. H. Downs and F. A. Thompson.

ST. LOUIS.—Inland Machine Works has increased its capital stock from $8,000 to $30,000.

ST. LOUIS.—Wayne Truck Co. has bought a site, 125 x 187 feet, and will build a garage and machine shop.

ST. LOUIS. — A. B. Groves, architect, Stock Exchange building, is preparing plans for an 8-story warehouse, estimated to cost $150,000.

ST. LOUIS.—The new board of aldermen is said to be pledged to establish a municipal electric plant. It is estimated a sufficient plant for the service required will cost $6,000,000. M. R. H. Witter is city engineer.

ST. LOUIS.—Ballman-Witten Mfg. Co., 5407 Easton avenue, has been incorporated to manufacture piston rings; $100,000 capital stock; E. C. Ballman is president. Lathes and boring machines will be installed.

COUNCIL BLUFFS, IA.—Plans are being made by H. N. Howard, county engineer, for bridges to cost $20,000, including two 65-foot pony trusses, a 40-foot pony truss, one 24-foot and one 20-foot I-beam span and 14 culverts.

FORT DODGE, IA. — C. P. Bratnober, Waterloo, is planning to build a $220,000, 8-story, fireproof hotel in Fort Dodge, 100 x 140 feet.

MARSHALLTOWN, IA.—Chicago & Northwestern railroad will ask bids soon on a 1,100-foot viaduct over its tracks at Third avenue.

ODEBOLT, IA.—A 20-year franchise has been granted to Russell & Fry, Corydon, Ia., who will build a $15,000 electric light plant.

OSAGE CITY, IA.—Citizens have voted $10,500 in bonds for water works improvements and tank.

SAC CITY, IA.—County supervisors have ordered the construction of a 30-foot span bridge with steel beams and concrete floor, a 90-foot, steel truss bridge and 20-foot, steel and concrete bridge.

BRAINERD, MINN.—Bids will be received until June 1 in a readvertisement by C. W. Mahlum, county auditor, for redecking the Laurel street bridge with creosoted blocks.

DULUTH, MINN.—C. E. Kling is planning to erect an automobile assembling and rebuilding plant costing $250,000.

DULUTH, MINN.—W. T. Brady, architect, 1200 Fidelity building, is taking bids on a 2-story garage, 50 x 115 feet, for W. M. Brindler & Co., Lawnsdale building.

DULUTH, MINN. — Gowan, Lemming, Brown Co., Fifth avenue, will build a $300,000, 6-story warehouse, 160 x 360 feet. F. S. German, architect, 411 American Exchange Bank building, is in charge.

FARIBAULT, MINN.—Ideal Lamp Mfg. Co. is building an addition to its plant.

MINNEAPOLIS.—C. E. Bell, architect, has let the contract for a 12-story hotel to the Evans Construction Co., Fort Dodge, Ia., at about $125,000.

MINNEAPOLIS.—C. A. Bell, architect, 312 Society Bank building, is taking bids for A. W. Harwood, 2644 Aldrich avenue, for a commercial garage, four stories, 65 x 177 feet, to cost $60,000.

ST. PAUL, MINN.—The water board has voted that water works improvements be undertaken including an aerator and pump costing $25,000, a 15,000,000-gallon high service pump and two 6,000,000-gallon low service pumps, costing $70,000.

SOUTHERN STATES

NORFOLK, VA.—Seaboard Air Line is taking preliminary bids on equipment to replace that damaged by fire at its shops recently.

PETERSBURG, VA.—A $225,000 steel and concrete structure will replace the Bishop bridge, connecting Petersburg with Chesterfield county. G. C. Wright is chairman of the council committee on bridges.

ANNISTON, ALA.—Kilby Locomotive & Machine Works is to build a malleable foundry and is in the market for equipment.

YAZOO CITY, MISS.—Orr Modern Motor Co. has been incorporated to manufacture an automobile speed device; $2,000,000 capital stock; by Harry Priestly, J. H. Hinchliff of Vicksburg and others.

DALLAS, TEX.—A water works pump of 20,000,000 gallons capacity or over has been recommended for the Turtle Creek station.

DALLAS, TEX.—Lyle Marshall and H. R. White, of Nashville, Tenn., are to build a $125,000 plant to manufacture steel wire springs, cots and davenports.

GALVESTON, TEX. — Gulf, Colorado & Santa Fe railroad, F. Merritt, chief engineer, has appropriated $55,000 for bridges and $10,000 for machine shop equipment.

HUSTON, TEX. — International & Great Northern railroad is planning to spend $1,000,000 for improvements and extensions.

MARLIN, TEX.—The public improvements and water works commission is considering the establishment of an electric plant at the water works.

PLEASANTON, TEX.—L. B. Myers, El Reno, Oklahoma, is to build a $40,000 electric and ice plant at North Pleasanton.

JASPER, ARK.—Newton county commissioners have let a contract to M. K. Orr, Harrison, Ark., for a $24,000 steel bridge over Big Buffalo river.

PARAGOULD, ARK.—H. W. Donaldson, secretary of the water commission, has let a contract for $28,000 water works to Reodecker & Connor, Kansas City, Mo.

BRICEVILLE, TENN. — The mayor has information regarding improvements to be made in the water system.

ELIZABETHTON, TENN. — Boone Fork Lumber Co., which has purchased 250,000 acres of timber land, will establish a sawmill with equipment costing $25,000. W. S. Whiting, Asheville, N. C., is president.

ERWIN, TENN.—A hydro-electric power plant probably will be established on the Nolichucky river, near Erwin, by Heath & Co., Charlotte, N. C.

JACKSON, TENN. — Jackson Railway & Light Co. is in the market for a wheel press.

KINGSPORT, TENN. — Kingsport Brick corporation has begun the erection of a tile plant. A steam power plant will be equipped, in addition to a machine shop. The special machinery has been purchased.

KNOXVILLE, TENN.—Consolidated Marble Co. has purchased marble lands and will buy quarrying and other machinery.

MEMPHIS, TENN.—F. H. Heiskell is to erect a 2-story, brick machine shop costing $10,000.

MEMPHIS, TENN.—F. W. Heiskell is to equip a new machine shop; the building contract has been let.

NONCONNAH, TENN.—Illinois Central railroad, general offices at Chicago, has announced that steel and concrete car repair shops, costing $300,000, will be erected in Nonconnah.

UNION CITY, TENN.—W. C. Morris is reported to be in the market for a 10-horsepower engine and generator.

BROMIDE, OKLA.—Benham Engineering Co. has been retained to plan a water works system and electric light plant. Special election to vote on bonds amounting to $15,000 will be called after plans are complete.

CUSHING, OKLA.—W. S. Barwich, engineer, Cushing, is planning for water works extensions to be built this fall, including a pumping plant, a dam and six miles of 10-inch main.

DRUMRIGHT, OKLA.—Bonds of $35,000 have been voted for a water works plant.

ENID, OKLA. — Hollingsworth Thrashing Machine Co. has been incorporated; $6,000 capital stock; by W. A. Hollingsworth and J. B. Milton, Enid, Frank Chelsey, Tulsa, Okla.

MANGUM, OKLA.—Council is considering

issuing $100,000 in bonds for an electric light plant.

NORTH MUSKOGEE, OKLA.—Oklahoma Motor Plow Co. has been incorporated; $100,000 capital stock; by J. R. Harns, B. F. Campbell of Fayettville and J. A. Lawrence, of Tahlequah, Oklahoma.

WESTERN STATES

MANDAN, N. D.—Morton and Sioux county commissioners are having plans drawn for a $7,500, 1-span steel bridge, 120 feet, over Cannon Ball river.

IRENE, S. D.—Bonds for $13,500 have been voted for a water works plant.

SIOUX FALLS, S. D.—Bonds for $140,000 have been voted for water works extensions on a plan by Daubny H. Maury, of Chicago. Bids on the bonds will be taken June 7, by Walter C. Leyse, city auditor.

BUTTE, NEB.—A steel span, 175 feet long, will be added to the bridge over the Nebraska river, near Birwood, at a cost of $10,000.

OMAHA, NEB.—Plans have been drawn by Harry Lawrie, 627 Caxton block, for a factory, six stories, 66 x 132 feet, to cost $100,000, for the Skinner Mfg. Co., Paul F. Skinner, president, at Fourteenth and Jackson street.

STERLING, NEB.—Grant & Fulton, Lincoln, have been retained to prepare plans for a water works system costing $17,000. Wm. Hitchcock is city clerk.

MASCOTAH, KAN.—The town board is considering plans for a municipal electric plant.

GREAT FALLS, MONT.—J. J. H. Cline, Poulson, Mont., has closed for a power site on Hellroaring creek, west of Poulson, and contemplates the erection of a power plant with which to operate his mill.

CRAIG, COLO.—The city has funds for a water works system to cost $35,000 to $40,000 to be built soon.

CASA GRANDE, ARIZ. — Franchise has been granted to F. H. Brackett for a $150,000 electric light plant.

GLOBE, ARIZ.—The city is taking bids on a viaduct, 184 feet long, 16-foot roadway and four foot sidewalks. H. C. Hansen city clerk.

ELK CITY, IDA.—It is reported the Gold Ridge Mining & Development Co., operating claims at Golden Hill, soon will install a mill. A. A. Hammer, Spokane, Wash., and others are interested.

SANDPOINT, IDA. — Ralph Reinertson, Spokane, Wash., representative of the Trestle Creek Power Co., announces work is to start shortly on the construction of a 680-horsepower, hydro-electric plant, and a 50-ton custom concentrator at Trestle Creek.

TWIN CITIES, IDA.—Consolidated Wagon & Machine Co. is having plans made for a foundry.

ANACORTES, WASH. — Great Northern railroad is taking steps toward the construction of a round house and turn table in Anacortes.

CHEHALIS, WASH.—Lewis County commissioners are taking bids for an 800-foot trestle.

MEYERS FALLS, WASH.—County Light & Power Co. has leased water rights along the Colville river, owned by George E. Meyers, Spokane, and others. The company will make extensive improvements and a new plant will be erected to supply power to the mines and towns in that locality. A. H. Sperry is president.

SEATTLE.—T. W. Griffith Smith is to build a commercial garage and machine shop costing $3,000 at 1001 Jackson street.

SEATTLE.—A Willits, Lyons building, is to build a garage and machine shop costing $11.000 at Ninth and Pine streets.

SEATTLE.—Bids will be received soon for the machinery and equipment necessary to handle grain at the warehouse in Hanford street, by the Seattle port commission.

SEATTLE.—J. B. West, chief engineer port of Seattle, is to prepare plans for refrigeration machinery in a fruit storage warehouse estimated to cost $100,000.

SEATTLE.—The board of public works has approved the plans of City Engineer Dimmock for the Fremont bridge and the Fifteenth avenue bridge. Contractors will be required to bid on the pound basis. The approximate cost of each bridge is $350,000. The Fremont bridge will contain about 1,100 tons of structural steel and 125 tons of machinery. There will be four large Westinghouse or equivalent motors, sprinkler system, solepoid brakes, electrically-operated gates, etc. The Fifteenth avenue bridge will contain 1,050 tons of steel and 110 tons of machinery.

TACOMA, WASH.—City Engineer Raleigh is preparing plans for a $14,000 bridge across the gulch at East Thirty-fourth street.

TACOMA, WASH.—Tacoma Central Heating Co. will begin shortly on the erection of a $250,000 plant.

TACOMA, WASH.—E. O. Reeder, assistant chief engineer of the Chicago, Milwaukee & Puget Sound railroad, is taking plans for a single track steel girder span over Bay street.

TACOMA, WASH.—The city council has passed an ordinance authorizing the execution of a contract between the city and the Tacoma Central Heating Co. for steam power for an electric generating plant, auxiliary to the hydro-electric plant of the city.

WENATCHEE, WASH. — Chelan Electric Co. has taken practically every preliminary step towards the development of electrical energy on Lake Chelan. The company is affiliated with the Great Northern railroad and a line of the company is likely to be electrified in this section. The proposed plant will furnish power and light for various communities in central Washington.

ASTORIA, ORE.—Port commission has instructed Engineer Walsh to determine the character and scope of the proposed grain elevators to be erected at docks at an estimated cost of $750,000.

GRESHAM, ORE.—This city is taking preliminary steps toward the erection of a $100,000 municipal lighting plant.

PORTLAND, ORE.—A. C. Meyer, 1084 Albina avenue, is building a commercial garage and machine shop costing $40,000.

LOS ANGELES. — Automatic Gang Drill Machine Co., newly incorporated with $20,000 capital stock by F. F. Stewart and associates, is to build a factory.

LOS ANGELES.—Plans are being made by Reid Brothers, California Pacific building, San Francisco, for a 10-story, class A building for H Merritt.

SAN FRANCISCO.—Union Oil Co., Los Angeles, has awarded contract to the Union Iron Works, San Francisco, for the construction of a $1,000,000 tank steamer, 435 feet. Turbines will propel the boat and electricity will drive the auxiliary equipment.

STOCKTON, CAL.—Western States Gas & Electric Co. is to build a $75,000, hydro-electric plant on the American river. Samuel Kahn, Stockton, is general manager.

Purchasing Agents for War Materials

Sellers desiring to get in touch with foreign purchasing agents for war materials may address the Russian representatives, Messrs. S. Ruperti and Aiekieff, in care of the Russian Military Embassy, Washington, D. C.

The purchasing agents for England and France are as follows:

British.—Lieut. Johnston and A. C. Billing, Ritz Carlton hotel, Montreal.

French.—Hudson Bay Co., 56 McGill street, Montreal; Capt. Lafoulloux, Hotel Brevort, New York City; Direction de l'Intendance Minstere de la Guerre, Bordeaux, France; M. De la Chaume, 28 Broadway, Westminster, London.

ALASKA

JUNEAU, ALASKA. — Alaska-Juneau Gold Mining Co. will erect an 8,000-ton milling plant; hydro-electric plant and a 30,000-gallon oil tank will be installed; P. R. Bradley, superintendent.

JUNEAU, ALASKA.—It is reported the Ebner Gold Mining Co. has appropriated $4,000,000 for improvements which will include $1,000,000 for a hydro-electric plant and a 30,000-gallon oil storage tank.

SEWARD, ALASKA. — Jack McEachern, Seward, and others have formed a company to establish an electric power and light plant for Ship Creek.

NEW CATALOGS

ORE MILLING AND SMELTING MACHINERY.—The Kennedy-Stroh Corporation, 120 Broadway, New York, has issued the second edition of its extensive 86-page catalog covering ore milling, cyaniding and smelting machinery. Descriptions of crushers, feeders, stamp mills, tube mills, ball mills, etc., are presented. Considerable space also is devoted to copper converters, ladles, slag pots, etc.

WOOD BLOCK FLOORS.—An attractive booklet dealing with the use of wood blocks for interior use has been issued by the Ohio Wood Preserving Co., Commonwealth building, Pittsburgh. Full page halftone plates are presented showing typical wood block floors in industrial plants. A series of thumbnail sketches also are published showing the method of laying wood block flooring to produce the most satisfactory results.

SHOVELING MACHINES. — The Myers-Whaley Co., Knoxville, Tenn., has issued a 28-page catalog devoted to its line of shoveling machines for underground and surface work. These machines are said to be applicable to a wide range of uses. They can be operated by electricity, gasoline, compressed air or steam. The catalog contains a brief description of the advantages of these machines as well as a number of interesting photographs showing them in operation.

WIRE WHEEL BRUSHES.—A six-page folder, issued by the Herold Bros. Co., Cleveland, is devoted to its line of wire wheel brushes especially adapted for cleaning castings. These brushes are built up of several sections of tempered steel wire, the wires being twisted in a binding strand of two heavy wires bent in the form of a wheel with the ends electrically welded, thereby making a continuous circle. As many of these sections as are required to make the desired width of wheel are clamped together with steel clamps. A hub then is fitted to the wheel, the two sections of which are grooved to engage with the clamps. The hub is refillable and therefore it is only necessary to have one for each machine.

IRON AND STEEL PRICES

Corrected up to Tuesday noon

PIG IRON

(Delivery to July 1.)

Bessemer, valley	$13.60
Bessemer, Pittsburgh	14.55
Basic, Pittsburgh	13.45 to 13.60
Basic, eastern Pa.	13.25
Malleable, Pittsburgh	13.45 to 13.95
Malleable foundry, Chicago	13.00
Malleable foundry, Philadelphia	15.00 to 15.25
Malleable foundry, Buffalo	12.50 to 13.00
No. 1X foundry, Philadelphia	14.25 to 14.50
No. 2 foundry, Pittsburgh	13.45 to 13.95
No. 2 foundry, valley	12.50 to 13.00
No. 2 foundry, Cleveland	13.00
No. 2 foundry, Ironton	12.50 to 12.75
No. 2 foundry, Chicago	13.00
No. 2X foundry, Philadelphia	14.00 to 14.25
No. 2X fdy., N. J. tidewater	14.25 to 14.50
No. 2X foundry, Buffalo	12.50 to 13.00
No. 2 plain, Philadelphia	13.75 to 14.00
No. 2 plain, N. J. tidewater	14.00 to 14.25
No. 2 plain, Buffalo	12.25 to 12.50
No. 2 southern, Birmingham	9.75 to 10.00
No. 2 southern, Cincinnati	12.65 to 12.90
No. 2 southern, Chicago	13.50 to 14.00
No. 2 southern, Phila. delivery	14.00 to 14.25
No. 2 southern, Cleveland	13.75 to 14.00
No. 2 south'n, New York docks	13.75 to 14.00
No. 2 southern Boston, docks	13.75 to 14.00
No. 2 south. interior, New Eng.	14.50 to 15.50
No. 2 southern, St. Louis	13.40
Virginia No. 2X furnace	12.50 to 13.00
Virginia 2X, Philadelphia	15.25
Virginia 2X, Jersey City	15.50
Virginia 2X, Boston points	15.75
Gray forge, eastern Pa.	13.25 to 13.50
Gray forge, Pittsburgh	13.20
Gray forge, Birmingham	8.75 to 9.00
Silveries, 8 per cent, Jackson, O.	14.75 to 15.25
Silveries, 5 per cent Birmingham	12.50
Silveries, 5 per cent, Chicago	16.35
Standard low phos., Phil.	19.00 to 20.00
Lebanon low phos., furnace	16.00 to 16.50
Low phos., Pittsburgh	20.95 to 21.20
Charcoal, Lake Superior, Chgo., Nos. 1 to 4	15.25 to 16.25
Charcoal, Buffalo	15.75 to 17.00
Charcoal, Birmingham	25.00

IRON ORE

(Lower lake ports.)

Old range Bessemer, 55 per cent	$3.75
Mesabi Bessemer, 55 per cent	3.50
Old range, non-Bess., 51½ per cent	3.00
Mesabi non-Bessemer, 51½ per cent	2.85

(Per unit Philadelphia.)
(Prices nominal.)

Foreign Bess., 50 to 65 per cent	7c to 8¼c
For'n non-Bes., 50 to 65 per cent	7c to 8¼c

COKE

(At the ovens)

Connellsville furnace	$1.55 to 1.60
Connellsville fur. contr.	1.65 to 1.75
Connellsville foundry	2.00 to 2.40
Connellsville fdy. contr.	2.25 to 2.50
Wise county furnace	1.75 to 2.00
Wise county foundry	2.10 to 2.40
Pocahontas furnace	1.75 to 2.00
Pocahontas foundry	2.00 to 2.25
New River, foundry	2.50 to 3.00
New River, furnace	2.00 to 2.25

FERRO-ALLOYS

Ferro-mang., Balti.	$100
Ferro-mang. (future), Balti	....
Ferro-silicon, 50 per cent, Pbgh.	71.00 to 73.00
Ferro-silicon, 50 per cent, Phila.	71.00 to 73.00
Ferro-sil., 12 to 13 per cent	18.00 to 18.50
Ferro-sil., 11 to 12 per cent	17.00 to 17.50
Ferro-sil., 10 to 11 per cent	16.00 to 16.50
Ferro-sil., 9 to 10 per cent	15.00 to 15.50

(Ferro-silicon quoted at furnace Ashland, Jackson and New Straitsville)

Ferro-carbon titanium, carloads, per lb.	8c to 12½c

SEMI-FINISHED STEEL

Open hearth billets, Phila	$21.56 to 22.06
Forging billets, Phila	24.56 to 25.06
Forging billets, Pbgh	25.00

Freight Rates via Panama Canal

Rates on finished materials, including plates, shapes, bars, wire, nails, etc., to Pacific coast points via Panama canal, per 100 lbs., in carload lots, exclusive of insurance and dockage.

From New York	$0.45
From Pittsburgh	.619
From Youngstown	.639
From Niles	.619
From Wheeling	.619
From Steubenville	.619
From Johnstown	.604
From Coatesville	.545
From Steelton	.555
From Bethlehem	.529
From Cleveland	.65
From Chicago	.765

Rates on sheet mill products $2 per ton higher.

Wire rods, Pittsburgh	$25.00
Billets, Pittsburgh	19.50 to 20.50
Billets, Youngstown	19.00 to 19.50
Sheet bars, Pittsburgh	20.00 to 21.00
Sheet bars, Youngstown	19.50 to 20.00
Muck bar, Pittsburgh	27.00

RAILS AND TRACK MATERIAL

Stand. Bess., rails, Pbgh	1.25c
Stand. open-hearth rails, Pbgh.	1.34c
Lgt. rails, 8-lbs., Pbgh. & Chgo.	1.22c
Lgt. rails, 12 lbs., Pbg. & Chgo.	1.17c
Lgt. rails, 16 to 20 lbs., Pgh. & Chgo.	1.12c
Lgt. rails, 25 to 45 lbs., Pbgh. and Chgo.	1.07c
Relaying rails, standard, Pbgh. & Chgo.	$23.00 to 24.00
Relaying rails, light, Chicago	21.50 to 22.50
Angle bars, st. sect, Pbgh. base.	1.50c
Angle bars, st. sections, Chicago	1.50c
Spikes, railroad, Pbgh.	1.35c to 1.40c
Spikes, railroad, Chgo.	1.50c
Track bolts, Pbgh.	1.85c to 1.90c
Track bolts, Chgo.	2.00c

Freight Rates, Pig Iron

Mahoning and Shenango valleys to:—	
Cleveland	$0.95
Newark, N. J.	3.00
New England	3.00
Philadelphia	2.79
Pittsburgh	.95
St. Louis	3.18
Buffalo to:—	
Albany, N. Y.	$1.26
New England (all rail)	2.58
New York and Brooklyn (all rail)	2.58
New York and Brooklyn (by canal)	1.00 to 1.50
Virginia furnaces to:—	
Boston docks (r. and w.)	$3.05
New England (all rail)	3.25
New York dock (r. and w.)	2.88
Birmingham, Ala., to:—	
Cincinnati	$2.90
Chicago	4.00
Cleveland	4.00
Louisville, Ky.	2.65
New York (all rail)	6.15
New York (rail and water)	4.25
Philadelphia (all rail)	5.20
Philadelphia (rail and water)	4.00
Pittsburgh	4.90
Savannah, Ga.	2.75
Chicago, to:—	
Des Moines	$2.80
Milwaukee	.50
Moline, Ill.	1.47
Omaha	3.58
St. Louis	1.58
Ironton and Jackson, O., to:—	
Chicago	$2.54
Cincinnati	1.26
Cleveland	1.62
Detroit	1.81
Indianapolis	1.58

SHAPES, PLATES AND BARS

Structural shapes, Pittsburgh	1.20c
Structural shapes, Chicago	1.39c
Structural shapes, Philadelphia	1.359c
Structural shapes, New York	1.369c
Struc. shapes, San Francisco	2.00c to 2.05c
Tank plates, Chicago	1.29c to 1.39c
Tank plates, Pittsburgh	1.15c to 1.20c
Tank plates, Philadelphia	1.359c
Tank plates, New York	1.369c
Bars, soft steel, Pittsburgh	1.20c
Bars, soft steel, Chicago	1.39c
Bars, soft steel, Philadelphia	1.359c
Bars, soft steel, New York	1.369c
Hoops, carloads, Pittsburgh	1.25c to 1.30c
Bands, Pittsburgh	1.20c
Shafting, Pbgh., carloads, prompt	68 to 70 per cent off
Shafting, Pbgh., contr.	68 per cent off
Screw stks., Pgh. carl'ds,	68 to 70 per cent off
Bar iron, Chicago	1.15c to 1.20c
Bar iron, Philadelphia	1.175c to 1.225c
Bar iron, New York	1.15c to 1.20c
Bar iron, Cleveland	1.20c to 1.25c
Bar iron, Pittsburgh	1.20c to 1.25c
Hard steel bars, Chicago	1.20c to 1.25c
Smooth finish, mchy. steel, Chi.	1.68c

SHEETS AND TIN PLATE

No. 28, black, Pittsburgh	1.80c to 1.90c
No. 28, black, Chicago	1.89c to 1.94c
No. 28, tin mill, black, Pbgh.	1.85c to 1.90c
No. 28, galvanized, Pbgh.	3.60c
No. 28, galvanized, Chgo., nom.	3.94c
No. 10, blue, annealed, Pbgh.	1.35c
No. 10, blue, annealed, Phila.	1.459c to 1.509c
Tin plate, 100 lb., coke base	3.10c to 3.20c

EXTRAS FOR SHEET OR TIN MILL SPECIFICATIONS

(Per hundred pounds.)

Single pickled, cold roll, and re-anl.	30 cents
Hot roll'd pickl'd and anl., tin mill	25 cents
Full pickl'd, cold rolled and re-anl.	50 cents
Auto sheets	75 cents
Blued stove pipe stock	10 cents
Range steel	30 cents
Re-squaring	10 cents
Roller leveling	10 cents
Patent leveling and re-squaring	35 cents
Oiling sheets	10 cents
Deoxidizing	10 cents
Lime finish	10 cents
Open-hearth stamping steel, free from mill scale	55 cents
Special open hearth deep stpg. steel free from mill scale	80 cents
Extra deep special auto body stock	$1.25
Ext. for 28 gage ov. 32 to 36-in. wide	10 cents

No reduction for sheets not annealed.

The above extras apply on both sheet and tin mill specifications, at the same rate.

IRON AND STEEL PIPE

(Pittsburgh.)

	Black. Butt-weld.	Galv. Butt-weld.
Steel, ⅜ to 3 inches	79	68½
Iron, ⅜ to 2 inches	71	57
	Lap-weld.	
Steel, 2½ to 6 inches	78	67½

BOILER TUBES

Steel, 3½ to 4½ inches l. c. l.	74
Iron, 3½ to 4½ inches l. c. l.	62

WIRE PRODUCTS

(Retailers' price 5 cents above jobbers' quotation.)

Wire nails, jobbers, Pittsburgh	$1.55 to 1.60
Plain wire, jobbers, Pittsburgh	1.35 to 1.40
Galvanized wire, jobbers, Pbgh.	1.85 to 1.90
Polished staples, Pbgh.	1.55 to 1.60
Galvanized staples, Pbgh.	2.05 to 2.10
Barb wire, painted, jobbers, Pbgh.	1.55 to 1.60
Barb wire, galv., jobbers, Pbgh.	2.05 to 2.10

IRON AND STEEL PRICES

Corrected up to Tuesday noon

BOLTS AND NUTS

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, smaller or shorter, rolled threads, 80 and 15; cut threads 80 and 10; larger or longer, 75 and 17½.

Machine bolts with hot pressed nuts ⅜ x 4 inches, smaller or shorter, rolled 80 and 20; cut, 80 and 15; larger or longer, 80.

Gimlet and cone point lag or coach screws, 85 and 2½.

Hot pressed square, blank or tapped nuts. $6.40 off list; hot pressed hexagon blank or tapped, $7.30 off.

Cold pressed, square, blank or tapped, $6.10 off; hexagon, blank or tapped, ⅜ inch and larger, $7.50; ⅜-inch and smaller, $8.00.

RIVETS

Structural rivets, Pbgh	1.45c to 1.50c
Structural rivets, Chgo	1.68c
Boiler rivets, Pbgh	1.55c to 1.60c
Boiler rivets, Chgo	1.78c

STEEL SHEET PILING

(Pittsburgh.)

Base sizes	1.55c to 1.60c

COLD ROLLED STRIP STEEL

(Subject to regular extras.)

0.10 to 0.19 Carbon.	Base price Cut to length	
1½ inch and wider	Hard.	Soft.
0.100 and thicker	2.85	3.10
0.050 to 0.099 inc.	2.95	3.20
0.035 to 0.049 inc.	3.10	3.35
0.031 to 0.034 inc.	3.35	3.75
0.025 to 0.030 inc.	3.60	4.00
0.020 to 0.024 inc.	3.80	4.20
0.017 to 0.019 inc.	4.70	5.20
0.015 and 0.016	5.10	5.60
0.013 and 0.014	5.95	6.45
0.012	6.55	7.05
0.011	6.90	7.40
0.010	7.25	7.75
	Coils.	
0.100 and thicker	2.75	3.00
0.050 to 0.099 inc.	2.80	3.05
0.035 to 0.049 inc.	2.95	3.20
0.031 to 0.034 inc.	3.10	3.50
0.025 to 0.030 inc.	3.20	3.60
0.020 to 0.024 inc.	3.30	3.70
0.017 to 0.019 inc.	3.60	4.10
0.015 and 0.016	4.00	4.50
0.013 and 0.014	4.70	5.20
0.012	5.05	5.55
0.011	5.40	5.90
0.010	5.75	6.25

CAST IRON WATER PIPE

Six to 48-in., Cleveland	23.75
Four-inch, Chicago	25.50
Six to 12 inches, Chicago	23.50
Large sizes, Chgo	23.00
Six-inch, New York	20.50 to 21.50
Four-inch, New York	21.50 to 22.50
Four-inch, Birmingham	20.50
Six-inch and larger, Birmingham	18.50

Gas pipe, $1 per ton higher than water.

WAREHOUSE PRICES

Steel bars, Chicago	1.65c
Steel bars, Cleveland	1.80c
Steel bars, Cincinnati	1.75c to 1.80c
Steel bars, Philadelphia	1.70c
Steel bars, New York	1.80c
Steel bars, St. Louis	1.70c
Iron bars, Chicago	1.65c
Iron bars, Cleveland	1.75c
Iron bars, St. Louis	1.65c
Iron bars, Cincinnati	1.70c to 1.80c
Iron bars, Philadelphia	1.55c
Iron bars, New York	1.65c to 1.70c
Hoops, Chicago	2.15c
Shapes and plates, Chicago	1.75c
Shapes and plates, Cleveland	1.90c
Shapes and plates, Cincinnati	1.85c to 1.90c
Shapes and plates, St. Louis	1.80c
Shapes and plates, Philadelphia	1.70c
Shapes and plates, New York	1.85c
No. 10 blue anl. sheets, Chgo	1.95c
No. 10 blue anl. sheets, Cleve	2.05c
No. 10 blue anl. sh. St. Louis	2.00c
No. 10 blue anl. sheets, Cinci	2.00c
No. 28 black sheets, Chgo	2.45c
No. 28 black sheets, Cleveland	2.45c
No. 28 black sheets, Cincinnati	2.45c to 2.55c
No. 28 black sheets, St. Louis	2.55c
No. 28 galv. sheets, Chgo	4.00c
No. 28 galv. sheets, Cleveland	3.50c
No. 28 galv. sheets, Cincinnati	3.40c to 3.55c
No. 28 galv. sheets, St. Louis	3.75c

Freight Rates, Coke

Connellsville regions, per 2,000 lbs., to:—	
Baltimore	$1.80
Buffalo	1.85
Chicago	2.50
Cleveland	1.60
Detroit	2.10
East St. Louis	2.80
Joliet	2.50
Louisville	2.50
Milwaukee	2.70
New York	2.85
Philadelphia	2.05
Pittsburgh	.75
Richmond, Va.	2.94
Toledo	1.85
Valley Furnaces	1.20
Cincinnati	2.00

IRON AND STEEL SCRAP

(Net Tons.)

No. 1 railroad wrought, Chgo.	$ 8.75 to 9.25
No. 1 railroad wrought, Cleve.	9.25 to 9.50
No. 1 railroad wrought, St. L.	7.75 to 8.00
No. 1 railroad wrought, Cincin.	7.50 to 8.00
No. 2 railroad wrought, Chgo.	8.25 to 8.50
No. 2 railroad wrought, St. L.	7.25 to 7.50
Arch bars and transoms, Chgo.	12.00 to 12.50
Arch bars and transoms, St. L.	10.50 to 11.00
Knuckles, coup. & spr'gs, Chgo.	8.75 to 9.00
Knuckles, coup. & spr'gs, St. L.	8.00 to 8.50
Shafting, Chicago	11.75 to 12.25
Shafting, St. Louis	10.50 to 11.00
Steel car axles, Chicago	10.25 to 10.75
Steel car axles, St. Louis	10.00 to 10.25
Locomotive tires, Chicago	8.50 to 9.00
Locomotive tires, St. Louis	8.75 to 9.00
Cut forge, Chicago	8.25 to 8.75
Pipes and flues, Chicago	6.25 to 6.75
Pipes and flues, Cleveland	7.25 to 8.00

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 lbs. to:—	
New York	16.9 cents
Philadelphia	15.9 cents
Boston	18.9 cents
Buffalo	11.6 cents
Baltimore	15.4 cents
Cleveland	10.5 cents
Cincinnati	15.8 cents
Chicago	18.9 cents
Minneapolis and St. Paul	32.9 cents
Denver	68.6 cents
St. Louis	23.6 cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, (all rail)	80 cents
Pacific coast, via Panama canal	61.9 cents

Pipes and flues, St. Louis	6.00 to 6.25
No. 1 cast, Chicago	9.00 to 9.25
No. 1 cast, Cleveland	10.00
No. 1 cast, Cincinnati	8.50 to 9.00
No. 1 cast, St. Louis	8.75 to 9.00
No. 1 busheling, Chicago	7.25 to 7.75
No. 1 busheling, Cleveland	8.25 to 8.50
No. 1 busheling, Cincinnati	6.00 to 6.50
No. 1 busheling, St. Louis	6.75 to 7.00
No. 2 busheling, Chicago	6.00 to 6.50
No. 1 boiler plate, cut, Chgo	5.50 to 5.75
No. 1 boiler plate, cut, St. L.	5.25 to 5.50
Boiler punchings, Chicago	8.25 to 8.75
Cast borings, Chicago	5.25 to 5.50
Cast borings, Cleveland	6.00 to 6.25
Cast borings, Cincinnati	4.75 to 5.25
Cast borings, St. Louis	5.25 to 5.50
Machine shop turnings, Chicago	5.00 to 5.50
Machine shop turnings, Cleve.	6.00
Machine shop turnings, Cinci.	$ 4.25 to 4.75
Machine shop turnings, St. L.	5.50 to 5.75
Malleable agricultural, Chicago	7.50 to 7.75
Malleable agricultural, St. Louis	5.50 to 6.00
Malleable, railroad, Chicago	7.75 to 8.25
Malleable, railroad, Cincinnati	6.00 to 6.50
Malleable, railroad, St. Louis	6.25 to 6.50
Angle bars, iron, Chicago	11.75 to 12.25
Angle bars, iron, St. Louis	10.00 to 10.50
Angle bars, steel, Chicago	8.25 to 8.50
Angle bars, steel, St. Louis	8.00 to 8.25
Stove plate, Chicago	7.75 to 8.00
Stove plate, Cleveland	8.00 to 8.25
Stove plate, Buffalo	8.25 to 8.75
Stove plate, Cincinnati	6.00 to 6.50
Stove plate, St. Louis	6.00 to 6.25
Bundled sheet, Cincinnati	4.75 to 5.25

(Gross tons.)

Heavy melting steel, Pbgh	$11.75 to 12.00
Heavy melting steel, Buffalo	10.50 to 11.00
Heavy melting steel, Chgo	9.25 to 9.50
Heavy melting steel, Cleveland	10.25 to 10.60
Heavy melting steel, Cincinnati	8.50 to 9.00
Heavy melting steel, eastern Pa.	11.00 to 11.50
Heavy melting steel, New York	8.75 to 9.00
Heavy melting steel, St. Louis	9.00 to 9.50
Grate bars, Buffalo	9.00 to 9.50
Grate bars, New York	6.50 to 7.00
No. 1 railroad wrought, east. Pa.	12.50 to 13.00
No. 1 railroad wrought, Pbgh	10.25
No. 1 R. R. wght., New York	10.50 to 11.00
No. 1 R. R. wrought, Buffalo	10.50 to 11.00
Shafting, New York	13.00 to 13.50
Shafting, eastern Pa.	15.00 to 15.50
Wrought pipe, New York	8.25 to 8.50
Wrought pipe, eastern Pa.	10.50 to 10.75
Mch. shop turnings, New York	6.00 to 6.25
Machine shop turnings, Buffalo	5.75 to 6.25
Mch. shop turnings, Pbgh	8.00 to 8.25
Mch. shop turnings, eastern Pa.	8.25 to 8.50
Cast borings, New York	6.00 to 6.25
Cast borings, eastern Pa.	8.00 to 8.25
Cast borings, Buffalo	6.50 to 6.75
Cast borings, Pittsburgh	8.50 to 8.75
Stove plate, N. J. points	8.50 to 9.00
Stove plate, Pittsburgh	8.25 to 8.75
Stove plate, eastern Pa.	9.00 to 9.50
Shoveling steel, Chicago	8.75 to 9.50
Shoveling steel, St. Louis	8.00 to 8.25
Reroll. rails, 5 ft. & ov., Pbgh.	12.00 to 12.50
Reroll. rails, 5 ft. & ov., Chgo.	10.00 to 10.50
Reroll. rails, 5 ft. & ov., Cleve.	10.50 to 11.00
Reroll. rails, 5 ft. & ov., E. Pa.	11.50 to 12.00
Reroll. rails, 5 ft. & ov., St. L.	10.00 to 10.25
Steel rails, short, Chicago	10.00 to 10.50
Steel rails, short, Cleveland	11.00 to 11.50
Steel rails, short, St. Louis	9.25 to 9.50
Iron rails, Cleveland nom.	11.75 to 12.00
Iron rails, Chgo	12.00 to 12.50
Iron rails, Cincinnati	10.25 to 10.75
Iron rails, St. Louis	10.00 to 10.50
Iron rails, Pittsburgh (nom.)	12.50 to 13.00
Frogs, switches, guards, Chgo.	9.25 to 9.50
Frogs, switches, guards, St. L.	9.00 to 9.25
Car wheels, (iron), Pittsburgh	11.50
Car wheels, (steel), Pittsburgh	12.25 to 12.50
Car wheels, Chicago	9.75 to 10.00
Car wheels, eastern Pa.	10.75 to 11.25
Car wheels, Buffalo	10.00 to 10.50
Car wheels, N. J. points	9.50 to 9.75
Car wheels, St. Louis	9.75 to 10.00
Iron axles, Pittsburgh	17.50
Iron axles, Cincinnati	19.00 to 20.00
Iron axles, eastern Pa.	18.50 to 19.00
Iron axles, Buffalo	16.00 to 16.50
Iron axles, Chicago	15.25 to 15.75
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Steel car axles, New York	13.50 to 14.00
Steel car axles, Buffalo	12.00 to 12.50
Steel car axles, Cleveland	12.00 to 12.50
Steel car axles, eastern Pa.	14.00 to 14.50
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No. 1 busheling, Pittsburgh	9.75 to 10.00
No. 2 busheling, Buffalo	6.50 to 7.00
Low phosphorus steel, Buffalo	12.50 to 13.00
Low phosphorus steel, Pbgh	14.00
Low phos. steel, eastern Pa.	14.00 to 15.00
No. 1 forge, eastern Pa.	8.50 to 9.00
No. 1 cast, eastern Pa.	12.00 to 12.50
No. 1 cast, Pittsburgh	11.75 to 12.00
No. 1 heavy cast N. J. points	11.50 to 11.75
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Malleable railroad, Pittsburgh	10.00
Malleable railroad, Buffalo	9.50 to 10.00
Malleable railroad, east Pa.	9.25 to 9.75
Bundled sheet, Pittsburgh	9.00
Bundled sheet, Cleveland (nom.)	7.75 to 8.25
Bundled sheet, Buffalo	7.00 to 7.50

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How England Met Shortage of Metals

(*Continued from page* 1070).

aluminum powder used in a thermit mixture formerly was obtained entirely from Germany, the English firms acting as distributors. When the war commenced, the English firms began the manufacture of thermit. Exhibitors at the meeting showed this welding compound as well as a sample of 75 per cent ferro-chromium, manganese copper containing 30 per cent manganese and 70 per cent copper, 96.5 per cent metallic manganese and chromium 98½ per cent metallic. All these metals formerly were made in Germany and are now being made in England.

Refractory materials were previously imported from Germany. An exhibit of the Morgan Crucible Co., London, showed a number of these articles now made in England. These included a large tube used for inserting a pyrometer, a small tube for holding the thermal couples, and crucibles. The Kelham Island Firebrick Co. exhibited firebricks.

Laboratory appliances formerly came largely from Germany. These included filter papers and glass vessels and tubes. Messrs. Belcher & Mason have begun the manufacture of glass ware and filter papers are being made by another English firm.

Outlook for the Future

It is too early to determine the final results of these various efforts. English manufacturers in many lines are experimenting upon the manufacture of new products, but in many cases the results of their efforts have not been made public. In turning out laboratory apparatus and supplies considerable progress has been made, and it is unlikely that Germany will again hold the predominant position she occupied nine months ago.

Forthcoming Meetings

American Foundrymen's Association.—A. O. Backert, secretary, Penton building, Cleveland. Convention Sept. 27, Oct. 1, Marlborough-Blenheim hotel, Atlantic City.

American Hardware Manufacturers' Association.—F. D. Mitchell, secretary, 1510 Woolworth building, New York.

American Institute of Electrical Engineers.—F. L. Hutchinson, secretary, 33 West Thirty-ninth street, New York. Next meeting at San Francisco, Sept. 16-18. Pittsburgh section, Charles R. Riker, secretary, 200 Ninth street; regular meetings second Tuesday of each month, Oliver building.

American Institute of Metals.—W. M. Corse, secretary, 106 Morris avenue, Buffalo. Atlantic City, Sept. 27 to Oct. 1.

American Institute of Mining Engineers.—Bradley Stoughton, secretary; Albert Sauveur, chairman of Iron and Steel Committee, 29 West Thirty-ninth street, New York. Next meeting at San Francisco Sept. 16-18.

American Iron and Steel Institute.—James T. McCleary, secretary, 30 Church street, New York. Spring meeting, New York, May 28-29.

American Iron, Steel and Heavy Hardware Association.—San Francisco, May 25-28.

American Railway Engineering Association.—E. H. Fritch, secretary, 900 South Michigan avenue, Chicago. Annual meeting, March 21-23, 1916, at Chicago.

American Railway Master Mechanics' Association.—J. W. Taylor, secretary, Karpen building, Chicago. Atlantic City, June 9-11.

American Railway Tool Foremen's Association.—Owen D. Kinsey, secretary, 7223 Ridgeland avenue, Chicago, Hotel Sherman, Chicago, July 19-21.

American Society of Civil Engineers.—C. W. Hunt, secretary, 220 West Fifty-seventh street, New York. Regular

meetings at New York, first and third Wednesday of each month, except June and August. Meeting at San Francisco, Sept. 16-17.

American Society of Mechanical Engineers.—Calvin W. Rice, secretary, 29 West Thirty-ninth street, New York. Spring meeting, Buffalo, June 22-25. Special fall meeting, San Francisco, Sept. 16-17.

American Society for Testing Materials.—Prof. E. Marburg, secretary, University of Pennsylvania, Philadelphia. Next meeting June 22-26, at Hotel Traymore, Atlantic City, N. J.

American Supply and Machinery Manufacturers' Association.—Philadelphia, June 3-5.

Association of Iron and Steel Electrical Engineers.—W. T. Snyder, secretary, National Tube Co., McKeesport, Pa. Regular meeting first Saturday of each month, Seventh Avenue Hotel, Pittsburgh. Annual convention, Hotel Statler, Detroit, Sept. 8-11.

Chicago Foundrymen's Club.—C. E. Hoyt, secretary, Lewis Institute, Chicago. Regular meetings second Saturday of each month.

Engineers' Society of Western Pennsylvania.—Elmer K. Hiles, secretary, Oliver building, Pittsburgh. Regular meeting, third Tuesday and section meeting first Tuesday of each month.

International Engineering Congress.—San Francisco, Sept. 20-25.

Lake Superior Mining Institute.—A. J. Yungbluth, secretary, Ishpeming, Mich. Next meeting on Gogebic range, in August.

Master Boiler Makers' Association.—Hotel Sherman, Chicago, May 25-28.

Master Car Builders' Association.—J. W. Taylor, secretary, Karpen building, Chicago. Atlantic City, June 14-16.

National Founders' Association.—W. H. Barr, president, Lumen Bearing Co., Buffalo; J. M. Taylor, secretary, Chicago; A. E. McClintock, commissioner, Chicago. Annual convention, Hotel Astor, New York, Nov. 17 and 18.

National Hardware Jobbers' Association.—F. D. Mitchell, secretary, 1510 Woolworth building, New York.

National Machine Tool Builders' Association.—Charles E. Hildreth, general manager, Worcester, Mass.

National Metal Trades Association.—J. D. Hibbard, commissioner, Chicago.

National Supply and Machinery Dealers' Association.—Secretary, Thomas A. Fernley, Philadelphia, June 3-5.

New England Foundrymen's Association.—Fred F. Stockwell, secretary, 205 Broadway, Cambridgeport, Mass. Regular meetings, second Wednesday of each month, at Exchange Club, Boston, except June, July and August.

Philadelphia Foundrymen's Association.—Howard Evans, secretary, Pier 45 North, Philadelphia. Regular meetings, first Wednesday of each month, at Manufacturers' Club.

Pittsburgh Foundrymen's Association.—F. H. Zimmers, secretary, Pittsburgh. Regular meetings, third Monday of each month, Fort Pitt Hotel, Pittsburgh.

Railway Supply Manufacturers' Association.—Atlantic City, June 9-16.

Society of Automobile Engineers.—C. F. Clarkson, secretary, 1745 Broadway, New York. Summer meeting, June 14-17, on board steamer Noronic, leaving Detroit, June 14.

Superintendents' and Foremen's Club of Cleveland.—Philip Frankel, secretary, 310 New England building, Cleveland. Meeting subject to call of executive committee.

Western Society of Engineers.—J. H. Warder, secretary, 1735 Monadnock building, Chicago. Regular meetings, first Monday of each month, except July and August, in Monadnock building.

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ENGINEER WANTED BY A LARGE manufacturing concern; must be a college graduate with some experience in handling men; mechanical training preferred but not essential; excellent opportunity for advancement. In reply state age, college, degree and salary expected. Address Box 435, THE IRON TRADE REVIEW, Cleveland, O.

ASSISTANT SUPERINTENDENT FOR bolt plant, both cold and hot work. Must be able to install up-to-date methods of manufacture. Good position for right man. Give age, reference and salary expected. Address Box 436, THE IRON TRADE REVIEW, Cleveland, O.

WE HAVE PLACES WITH SEVERAL of our clients for technically trained foundry executives, technical training, executive capacity and some foundry experience along production lines preferred. Salaries $1,500 to $1,800. The Engineering Agency, Chicago, Ill.

A MAN COMPETENT TO HANDLE correspondence and eventually act as Office Manager, experience in tool and special steel business required. Excellent opportunity for proper person. To receive attention, age, experience and salary expected must be stated. Address Box 426, THE IRON TRADE REVIEW, Cleveland, O.

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THE BEST WAY TO GET A GOOD POsition in drafting or engineering is to file an application direct with some of our clients who are depending on us to get competent and experienced applicants for their vacant positions. Send stamp for blank and list of vacant positions. The Cleveland Engineering Agency Co., Rose building, Cleveland, O.

WANTED: — FIRST-CLASS FOREMAN for structural steel shop, one thousand tons capacity, in Havana City, Cuba. Must be fully experienced in all departments of shops, active and competent to handle Spanish speaking labor. Permanent position for right man. Give references, experience and salary expected. American Steel Co. of Cuba, Box 654, Havana.

Positions Wanted

MECHANICAL ENGINEER; TECHNIcal training; 18 years' experience gas engines, machine tools, mill buildings, hydraulic machinery, ordnance work; 14 years in charge of work; 6 years as superintendent; can fill position of superintendent or chief engineer; good references. Address Box 341, THE IRON TRADE REVIEW, Cleveland, O.

STRIP STEEL MILL SALESMAN, (30) for road or New York representative, experienced in selling hot and cold rolled strip steel, salary or salary and commission. Address Box 419, THE IRON TRADE REVIEW, Cleveland, O.

Positions Wanted

PURCHASING AGENT AND COST accountant desires position; 32 years of age; 12 years' experience in large manufacturing plants. Highest references as to ability and character. Address Box 327, THE IRON TRADE REVIEW, Cleveland, O.

YOUNG MAN OF GOOD APPEARANCE and address, having ten years experience in the manufacture of open hearth steel, at present assistant superintendent of plant, desires change to a steel or manufacturing company which wants a hustler to understudy business; would like change to sales department; have high executive ability; can organize and handle all kinds of labor with efficiency; correspondence solicited. Address Box 418, THE IRON TRADE REVIEW, Cleveland, O.

PORCELAIN ENAMELER:—A MAN OF wide experience wants a job to build or operate a plant. Address Box 430, THE IRON TRADE REVIEW, Cleveland, O.

SUPERINTENDENT OR FOREMAN OF foundry desires position. Up to the minute in all branches. A-1 references. Address Box 429, THE IRON TRADE REVIEW, Cleveland, O.

OPERATING SUPERINTENDENT AND efficiency executive of crucible, electric and open hearth steel plants and rolling mills, fully qualified by seventeen years successful plant management experience, desires position wherein practical metallurgical, producing, economic, statistical and financial experience are required. Address Box 409, THE IRON TRADE REVIEW, Cleveland, O.

MECHANICAL ENGINEER, WITH AN experience of more than 25 years in the design of traveling cranes, hoisting and conveying machinery, rolling mill and steel works equipment, including also steam hammers, hydraulic machinery, ship yard machinery, etc., desires a position in the capacity of designing or chief engineer with a crane builder or a firm specializing in the manufacture of iron and steel works machinery. High-grade ability to design machinery from the standpoint of originality and economical shop production, together with great speed and accuracy in drawing office work. For a period of 18 years was connected with a concern of high standing in the building of traveling cranes and rolling mill equipment, latterly in the capacity of designing engineer and assistant to chief engineer. For five years was employed by another large crane builder in charge of the department of design of standard and special steel works cranes and for several years was designing engineer with another well-known builder of ore traveling cranes, electric monorail hoists, locomotive cranes, etc. References high grade and satisfactory in every respect. Address Box 425, THE IRON TRADE REVIEW, Cleveland, O.

Positions Wanted

FOUNDRY FOREMAN, HAVING BEEN in business and knowing the foundry business from the bottom up is looking for a position; up-to-date on cupolas, molding machines and economical production. Address Box 432, THE IRON TRADE REVIEW, Cleveland, O.

EXPERIENCED ENGINEERING Chemist, of middle west, in iron and steel industries would like to take position as superintendent or assistant or chief chemist; will take responsibility; analyze anything, also physical testing; experienced in fuel and furnace engineering; technical training, hard studying; correspondence invited. Address Box 433, THE IRON TRADE REVIEW, Cleveland, O.

STEEL FOUNDRY SUPERINTENDENT or general foreman; young man of unquestioned ability and character would like to connect with a firm offering a future. Address Box 434, THE IRON TRADE REVIEW, Cleveland, O.

STEEL FOUNDRY SUPERINTENDENCY by aggressive, competent man; crucible, electric or open hearth plants preferred. Expert knowledge of mixtures, melting, molding, casting and cost. Savings effected; refinements introduced. Address Box 410, THE IRON TRADE REVIEW, Cleveland, O.

EXPERIENCED PATTERN MAKER wishes position as foreman; over 10 years in charge of shops employing from 20 to 100 men making patterns for gas and oil engines and electrical machinery. Broad experience with molding machines. Address Box 253, THE IRON TRADE REVIEW, Cleveland, O.

MINE SUPERINTENDENT, MINING engineer desires similar position, ten years experience, five years superintendent of iron mine. At present employed, desire change to better living conditions. Will start on moderate salary with chance for advancement. Address Box 416, THE IRON TRADE REVIEW, Cleveland, O.

POSITION WANTED AS FOUNDRY foreman; experienced on gas engine work; general jobbing; good cupola practice; A-1 references. Address Box 417, THE IRON TRADE REVIEW, Cleveland, O.

WHEN YOU NEED A HIGH GRADE executive, engineer, draftsman or any technical man, consult The Engineering Agency, Inc., (Est. 21 years) 1662 Monadnock Block, Chicago.

MECHANICAL ENGINEER, 32 YEARS, who means work; has 3 years shop experience and 8 years experience as designer in car and steel mill work, desires position. At present employed in Pittsburgh district. Best of ability and character references furnished. Address Box 438, THE IRON TRADE REVIEW, Cleveland, O.

WANTED: — POSITION AS FOUNDRY foreman or superintendent, by young man with technical training, nine years experience in gray iron and malleable foundries. Three years as foreman. Address Box 439, THE IRON TRADE REVIEW, Cleveland, O.

WANTED: — POSITION BY YOUNG man as stenographer, correspondent and draftsman with six years experience in machine tool line. Graduate of International Correspondence School Mechanical Engineering Course. Address Box 440, THE IRON TRADE REVIEW, Cleveland, O.

Classified Advertisements continued on following page